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The West Side Highway North of 42nd Street
A Proposal For Discussion

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The West Side Highway North of 42nd Street
A Proposal For Discussion

August, 1974

Cover Photo: Opening day ceremonies on the Henry Hudson Parkway, 1937. New York Times Photo

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Contents

Study Origins
Study Origins 5

Context
History of West Side Parkland 8
Community Profile 11
Transportation 15
Existing Conditions 21

The Proposal
The Proposal 24

Effects
Parks 29
Traffic and Transit 36
Noise 39
Air Quality 46

Study Origins

Study Origins

The growth and redevelopment of residential, commercial, park land and transportation facilities have been historically interrelated on the West Side of Manhattan between Midtown and the George Washington Bridge

From 1846, when the Hudson River Railroad built a rail connection to Manhattan below the bluffs and farmlands of what is now the Upper West Side, development and improvement in transportation and community have gone forward together

This report contains the summary results of a feasibility study to help determine whether another phase in this century-old series of developments should take place It presents an opportunity to improve transportation serving Manhattan, extend and improve park lands and aid in the residential renaissance of the West Side

The feasibility study was undertaken in direct response to strongly expressed concerns that any effort to rebuild the Henry Hudson Parkway would result in destruction or severe damage to Riverside Park

The City and State of New York mutually agreed in 1971 that reconstruction of the West Side Highway from the Brooklyn-Battery Tunnel to the George Washington Bridge was desirable The old highway, built in the 1930's, was seriously deteriorated It was built only for automobile traffic with an emphasis on pleasure driving It did not accommodate truck and bus traffic, forcing trucks and buses to use Upper West Side streets

Any planning to reconstruct the highway required action by the State Legislature to add it to the State's Interstate System The original Henry Hudson Parkway from 72nd Street to the George Washington Bridge and the Miller Highway from Battery Park to 72nd Street were built as City highways

Legislation making the Miller Highway and the Henry Hudson Parkway a part of the State's Interstate Highway System was enacted in 1971 However, reflecting the fear that reconstruction of the Parkway might result in destruction of Riverside Park, an amendment to the legislation was adopted which, for all practical purposes, prevented any further effort by the New York State Department of Transportation in planning that reconstruction The amendment contained the following restrictive language

. . . That no route shall be constructed so as to encroach in any way on or over any land mapped or used for park purposes either during or after construction of the Riverside Park section, from West 72nd Street to the Cross Bronx Expressway.

Following the action of the State Legislature the State Department of Transportation requested the Federal Government to make the entire route from the Brooklyn-Battery Tunnel to the George Washington Bridge a part of the Interstate Highway System This would provide a connection among each of the Interstate System routes entering Manhattan at the George Washington Bridge and the Lincoln, Holland and Brooklyn Battery Tunnels More importantly, it would provide 90 percent Federal, 10 percent State funding to reconstruct a seriously deteriorated highway which for several years has been a part of the Tri-State Regional Planning Commission's high priority arterial network for the region

The Federal Government, acting through the Federal Highway Administration, specifically noted the restrictive legislation protecting Riverside Park and approved as a part of the Interstate System only that part of the highway from the Brooklyn-Battery Tunnel to the Lincoln Tunnel, with a connection to the existing West Side Highway at 42nd Street Planning and design work on the section of highway from the Battery to 42nd Street recently was completed [1]

Prior to the agreement by the City and State in 1971 to seek Interstate System designation for the entire West Side Highway, the New York State Urban Development Corporation prepared a study of ways in which significant amounts of New York City's many miles of waterfront could be reclaimed for housing parks, recreation and other social amenities to bolster the City's, and particularly Manhattan's attractiveness as a place to live as well as work The Urban Development Corporation study resulted in a report which proposed the reconstruction of the West Side Highway as a covered offshore facility which could provide for transportation needs as well as for the regeneration of the amenities required in a modern society for high quality living conditions [2] The report dealt primarily with the West Side from the Battery to 72nd Street However, additional study was given to the Riverside Park area, a similar alignment proposed and the results presented to interested groups on the Upper West Side A range of offshore alternatives also were studied by the City Transportation Administration Although discussed in general terms by many, the specific response was articulated by Community Board Seven in a report on the Master Plan for New York City [3] The report, with regard to the West Side Highway, said

[1] **West Side Highway Project Draft Environmental Impact Statement,** April 25, 1974 **West Side Highway Project Design Report,** April 1974

[2] **Wateredge Study,** Urban Development Corporation, April 1971

[3] **Comments on the Master Plan for New York City and District No 7,** Community Board Seven, Robert Kagan, Chairman, January 10, 1972

The development of an interstate highway along the lines proposed by UDC should offer substantial benefit to the city as a whole and to our community. The placing of the highway on the river, beyond the bulkhead line, would remove the highway from Riverside Park, thus immediately expanding the Park, and would remove truck traffic from Columbus and Amsterdam Avenues. The decking over and integrating of the highway into the park would further enlarge the park. All of this would create substantial expansion of the park's recreational facilities. This proposed highway development would, of course, also have to be integrated into the development with the Penn Central Yards.

The Community Board Seven report on the proposed Master Plan was comprehensive in many areas. Comments dealt directly with the Henry Hudson Parkway, Riverside Park, traffic on the Upper West Side street system, and land uses directly affected by the highway. Specifically noted was the then ongoing study of the 60th Street yards.

For almost two years a special committee has been considering the possibilities of platforming over the yards and building out to the Pierhead Line. This large site offers an opportunity to create housing, junior high school facilities, and fields for the West Side high schools which do not have them, recreational space for the community and perhaps commercial space to help absorb the costs. In spite of the substantial advantage that the development of this area could generate to the community as a whole, there is a lack of movement here. The Commission must be prepared to act as the land agency and supply the motor power for such a large project.[4]

The Community Board Seven comments renewed earlier suggestions made in 1967. Included were:

We see no proposals in the Plan to remove 'the torrent' of trucking (and buses) that impede all sense that the great parks are part of the West Side community. We suggested in 1967 studies to show whether 'to canalize this flow by depressed truck highways in the avenues or to divert it to a covered route along the Hudson River'. We do not ask that the Plan of 1969 provide absolute answers, but we do ask why the importance of this issue is not recognized and why there are no proposals to deal with it.[5]

The Board comments on Parks and Recreation included:

Usefulness of the Hudson River should be augmented by improving access to it, especially south of 72nd Street and in the stretch from 79th to 95th Streets. More direct access by means of quays or steps could make it usable for small boats. These could be integrated into the proposed redevelopment of the highway. Here, too, better lighting is a necessity to improve the park's usefulness. A continuous promenade and bike path should be established around the Manhattan riverfront but especially connecting the presently existing pieces in our area and extending them north to the George Washington Bridge.[6]

In commenting on streets, the Board report said in part:

Many of our recommendations have been listed under public spaces. But some are worth repeating with some detail here. For example, we support efforts to remove truck and bus traffic from the major north-south thoroughfares. In this regard, the efforts of our new West Side Highway Committee are to be applauded and plans to construct a new roadway that would carry this heavy traffic are to be encouraged.[7]

In addition to the above quoted comments, the Board report also had a specific section on the Highway and Riverside Park. The bill section states:

The Community Board, with the aims of:
A. Removing major through truck and bus traffic from the Avenues (Columbus, Amsterdam and Broadway), and
B. Enlarging and improving Riverside Park; supports the construction of an offshore interstate, 8 lane highway to be situated between the bulkhead and pierhead lines, if all the following stipulations are met in full.

1. The highway must be totally (100 percent) decked-over in both its north-south and east-west dimensions and continuously closed-off along its eastern edge. The deck is to be completed simultaneously with the highway construction.

2. The Deck's surface is to be imaginatively landscaped as continuous park land totally integrated into the overall design of Riverside Park. The level of adjacent park land is to be blended to that of the deck.

3. The entire existing West Side Highway is to be removed and returned to park land landscaped so as to blend with existing adjacent park.

4. There are to be no above grade structures with the exception of changes in the deck's grade to serve the purposes of a): variety in landscaping and design, and, b): certain park-related functional uses. Such grade changes in the deck's surface must be blended with the overall design of the deck's surface and adjacent related park area. Access and egress ramps (locations to be approved by Community Board Seven) to the highway must conform to these principles.

5. The venting of the roadway is to be directly out to the River with no perforations in the surface of the deck so that noise and fumes are excluded from the deck's surface and from adjacent park lands.

6. There shall be stair access for pedestrians to river level at desirable points. The 79th Street boat marina shall be reestablished.

7. All construction is to be carried on from the River with no construction and related traffic in the community or park. All materials are to arrive and all spoils are to be removed by barge. Construction noise is to be kept to a minimum conforming to the most stringent standards in this respect. There is to be a minimum dislocation of the use of the park while the existing highway is being returned to park land.

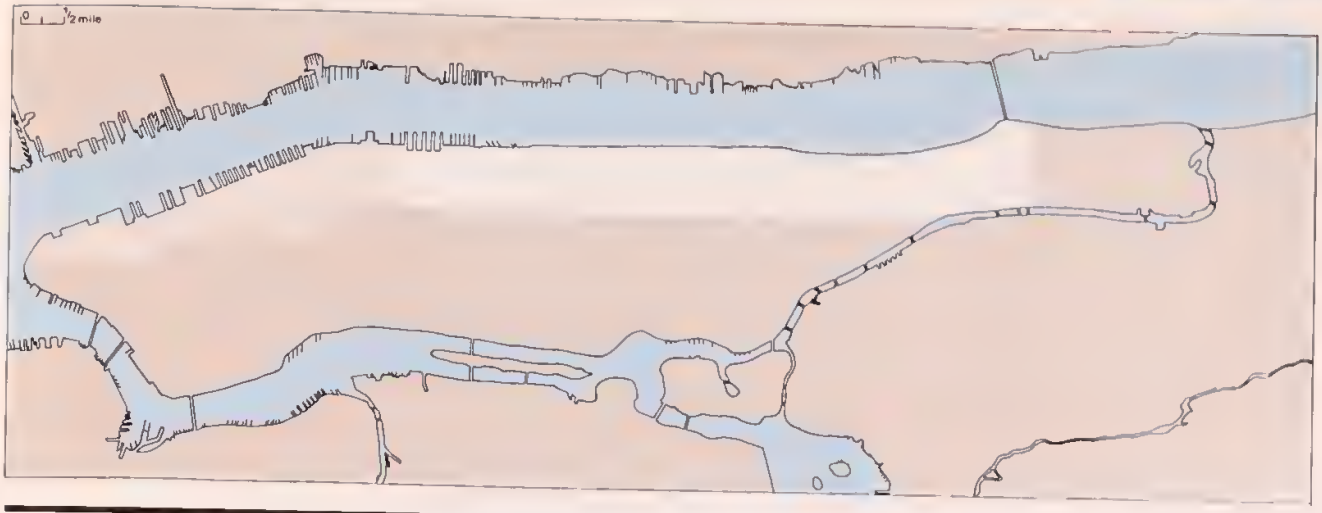
8. All aspects of function, design, access, etc. to be developed with Community Board Seven's consultation. Design, engineering, and other consultants to be retained with advice of Community Board Seven.

9. Community Board Seven requests a study be made by a qualified independent traffic expert ascertaining what access roads provided to the Highway to minimize traffic on all local streets, to remove truck traffic from Columbus and Amsterdam Avenues, with trucks prohibited from Riverside Drive. The Board also requests that this study make recommendations relating to highway design and use with an aim being not to increase the volume of commuter auto traffic into the city.

10. In the area between 59th and 72nd Streets the Board supports the continuance of a decked-over highway with the extension of Riverside Park on the deck, to conform to many of the principles previously stated. In this area only, however, the Board also supports the development of housing, educational and athletic facilities coordinated with the development of the Penn Central Yards.

The City, through the Transportation Administration, and the Urban Development Corporation, agreed to fund a preliminary feasibility study to determine whether it was possible to reconstruct the highway to meet the policy intent of the restrictive legislative amendment and the many concerns of the Upper West Side, including those of Community Board Seven as expressed above.

[4] Ibid, pages 3 and 4
[5] Ibid, page 12
[6] Ibid, page 14
[7] Ibid, pages 15 and 16



Location of West Side Highway Feasibility Study

West Side Highway Project

West Side Highway Feasibility Study

North

Several meetings were held with the West Side Highway Committee of Community Board Seven in an attempt to enlist cooperation. This included securing a pledge for the City that funds would be made available for the West Side Community Boards to hire consultants of their choosing to monitor the work of the project staff and to assist the community in the development of criteria, as well as help evaluate the results of the work on the feasibility study.

Ultimately, Community Board Seven joined with Community Boards Two and Nine to engage consultants with funds supplied by the City to monitor the feasibility study, the West Side Highway Project south of 42nd Street and a transit study being undertaken for the corridor. The consultants were also to carry out other study efforts as decided by the three Community Boards through their combined organization, COMBO.

The feasibility study heavily utilized data and information developed as part of the study and planning efforts of the West Side Highway Project between the Battery and Midtown. As a result, this report could not be completed until the study and planning effort to the south was concluded.

Essentially all of the basic data and most of the analysis for this study were completed prior to the closing of the West Side Highway and Henry Hudson Parkway in December 1973 and January 1974. Thus, this report does not include any detailed analysis of the major shifts in traffic which have resulted from closing the Parkway from 72nd to 79th Street and the narrowing down of the Parkway lanes in the 96th Street interchange area.

Preliminary analysis of shifting traffic patterns indicate that of the traffic which normally would use the West Side Highway to Midtown or to the south, about 70 percent has been diverted to the major Upper West Side thoroughfares and about 30 percent to the FDR Drive along the East River. While these percentages are subject to closer analysis and evaluation, it is apparent that there has been a significant increase on the major Upper West Side streets, a fact recognized by numerous community groups which have vigorously protested the increased traffic congestion and its effects in their neighborhoods.

While reconstruction of the West Side Highway between Midtown and the George Washington Bridge would not provide any short-term relief from the traffic consequences of the closed highway, the present condition does dramatically emphasize the vulnerability of the Upper West Side neighborhoods to the deteriorated condition of the 35-year-old highway.

Thus, the City and the Upper West Side communities are again faced with a periodically recurring dilemma of how to maintain and improve transportation while simultaneously taking steps to insure that the residential character of the adjoining neighborhoods as well as the recreational and environmental amenities closely associated with quality of life in a dense urban environment are not adversely affected as a result.

The seemingly mutually exclusive goals of better neighborhood characteristics, including expanded and improved park lands, and a transportation facility which provides city-wide and regional service rather than just for the neighborhood is a situation the Upper West Side has faced repeatedly in the past. ■

Context

History of West Side Park Land

The West Side north of 42nd Street, especially the Hudson River shoreline and Riverside Park, has passed through several stages over the past 100 years, each of which has resulted in dramatic improvements for the area. During each period seemingly irreconcilable conflicts between transportation facilities, park land and local communities have occurred, matching advocates for an improved recreational and residential environment against the effects of first the Hudson River Railroad, and later the automobile. These conflicts have been successfully resolved only after extensive debate and after solutions were proposed which substantially improved both transportation and the adjoining community.

This evolution is continuing today on much the same basis. Just as in the past, the deterioration, obsolescence, and negative environmental effects of an existing river edge transportation facility presents a problem for the city and at the same time a barrier for recreational activity and access to the water.

In 1846 the Hudson River Railroad was incorporated and empowered to build a new rail link from New York City to Albany thus providing a direct connection between the nation's largest commercial center and the expanding railroad network in the west. Starting in lower Manhattan, the company secured permission to lay track up Eleventh and Twelfth Avenues which at that time were little more than ungraded country roads extending north from the heart of the city below Canal Street. North of 59th Street the West Side was still rural in character with only occasional dwellings, taverns and some estates dotting the landscape. The railroad utilized inexpensive, undeveloped land along the Hudson River for its right-of-way through this area.

Soon afterwards, a railroad yard and passenger station near 30th Street helped to stimulate the northward expansion of the city into what is now known as Clinton. The rapid development of this area intensified street congestion to the point that railroad operations conflicted with the movement of carts and people in the area. The conflict between residential growth in Clinton and the continued operation of a street railroad, essential to the City's economy, was only the first of several irreconcilable differences between the railroad and adjacent communities.

During this same period the visionary plans of Frederick Law Olmsted and Calvert Vaux were being formulated, embracing a 100 block area north of West 55th Street. These men anticipated the continued development of the city up the entire West Side of Manhattan, and their plans led to the creation of Central Park in 1856, and Riverside Park by 1879. At the outset Riverside Park consisted of little more than a narrow treeless embankment between the Hudson River Railroad and the proposed Riverside Drive. The attraction of these parks and the new accessibility of the upper West Side due to Riverside Drive and the Ninth Avenue elevated railroad was demonstrated by the building boom which occurred in the 1880's. Residences quickly filled the area between Central Park and Riverside Park with mansions and palatial row houses lining Central Park and Riverside Drive.

As had occurred previously in Clinton, this new residential expansion soon came into conflict with the existing Hudson River Railroad. Despite the railroad's exclusive right-of-way at the river's edge and its importance to the City's economy, residents along Riverside Park found its smoking locomotives offensive and so reacted with considerable organized force when plans for expansion were aired. Additional tracks were proposed as well as a gas works at 72nd Street and other industrial facilities to be built on land fill west of the tracks.

A group named the West End Association was sufficiently alarmed to organize residents to press for legislation which would rescue the waterfront from the intrusion of such unsightly uses. In response to public sentiment, the New York State legislature of 1894 passed an act extending Riverside Park from the westerly line of the railroad track into the Hudson River to the United States Pierhead Line from 72nd to 129th Street. This addition was largely a legal maneuver rather than an extension of the existing park, because the new land was almost completely under water and totally inaccessible because of the railroad.

Riverside Park in the early 1900's

New York Times Photo

In the following years no improvements took place to make the designated park land publicly usable. As a result, it was again threatened in 1909 when contractors excavating the Catskill Water Aqueduct were permitted to dump two million cubic yards of stone along the shoreline with the intention of constructing additional railroad trackage and other facilities. Once again, residents of Riverside Drive and nearby areas banded together to protest the proposed increase in railroad capacity and the unabated commercial development of the waterfront which had continued in spite of the 1894 legislation.

For many years the Railroad, local communities and the City struggled with the complicated problem of getting the railroad line out of the way and out of sight, paying the bill for doing so, and still retaining a railroad which was the only all-rail freight route onto Manhattan Island. By 1929 feasible plans for accommodating park expansion and residential interests on the one hand, and the rail freight line on the other were combined in the West Side Improvement Program. For the first time a coordinated planning effort had been made to solve the environmental and transportation problems of both Clinton and the Upper West Side simultaneously.

New York Times Photo

with an uncovered rail line through the park

The Parkway under construction New York Times Pic

which covered the rail line with a promenade

The improvements in the Clinton area required the Railroad to give up its perpetual right to street operations on Eleventh and Twelfth Avenues and remove its track to a private right-of-way cut through rock parallel to Tenth Avenue. North of 60th Street the improvement program as originally presented, consisted of four elements, 1) the removal of unsightly commercial uses from the waterfront, 2) the construction of a promenade along a new seawall from 72nd to 129th Street, 3) the construction of a roof and a roadway over the railroad tracks, and 4) the landscaping of the newly created park land between the seawall and the covered railroad tracks.

While attempting to be responsive to the longstanding needs for eliminating street congestion and expanding Riverside Park, the thrust of these coordinated plans was to accommodate also a completely new transportation facility along the riverfront — the elevated Miller Highway and the Henry Hudson Parkway. This opportunity to solve existing problems and at the same time provide for future transportation needs was rarely recognized so early in the auto age. The new highway was designed as an elevated facility up Twelfth Avenue adjacent to Clinton, thus providing for through automobile traffic without interrupting access between the bustling waterfront and upland manufacturing and warehousing activities. North of 59th Street the highway would continue elevated over the 60th Street Railroad Yards, and then transform into a parkway located on top of the covered railroad right-of-way through an extended Riverside Park.

Construction was scarcely underway when the Depression halted large parts of the project, and it was not until 1934 that these efforts were renewed and finally completed. While the railroad relocations and elevated highway construction proceeded as previously planned in Clinton, major changes were suggested in the improvement plans for Riverside Park. A roadway built on top of the railroad tracks was perceived as dividing the entire park into two parts. Consequently portions of the proposed parkway were relocated near the shoreline. The original proposal for the parkway did not extend north of 129th Street. As a result, it was suggested that new park land could be built in the area west of the railroad tracks on fill in conjunction with parkway construction. This latter action would effectively expand Riverside and Fort Washington Parks north of 129th Street. The fill material for the park expansion was to come from excavation for the Eighth Avenue subway.

After some community apprehension, a revised plan was adopted which provided for park expansion, a roadway for "pleasure vehicle traffic" from 72nd Street north to the city line, and a landscaped roof over the railroad tracks.

By 1938 the work on both the elevated highway south of 72nd Street and the parkway extension to the north was completed. This project encouraged the expansion of maritime activities in West Midtown, improved the operational aspects of the West Side freight railroad, and resulted in 132 acres of new park land and park facilities along the entire Upper West Side. It is unlikely that any of these improvements could have been accomplished without the successful integration of all vital interests, appropriate funding mechanisms, and the physical facilities themselves. Thus the improvement in transportation was directly accountable for significant expansion and improvement of park lands and facilities and the covering of the railroad tracks to improve the environmental and aesthetic characteristics of Riverside Park.

but left many waterfront areas still inaccessible

Community Profile

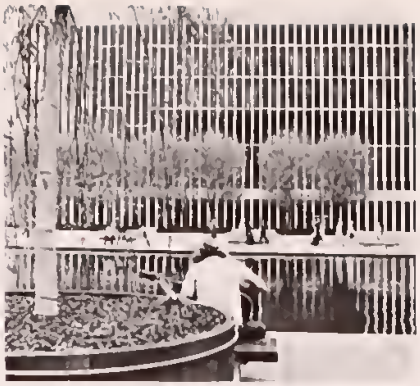
After the completion of the Miller Highway and the Henry Hudson Parkway in the 1930's, the West Side north of 42nd Street experienced a period of physical decline marked by major shifts in the composition and location of the residential population. By 1940 the turn of the century grandeur of the West Side had been overshadowed by an aging housing stock, competition from other residential areas of the city, and the financial constraints of the Depression. Following precedents from an earlier era of the City's history, the West Side began to absorb immigrants from war-torn Europe as well as Puerto Ricans, Blacks and other minority groups. In the early 1950's physical obsolescences had reached the point in some areas, where massive clearance was thought by some to be the only solution for stemming decline and reversing the trend toward increasing deterioration.

However, in more recent times, three important changes are occurring which have helped to redirect such negative trends, the strategic placement of subsidized housing first through the West Side Urban Renewal Project and then later by other mechanisms, renovation of the existing housing stock by the private sector, and an influx of more affluent residents to fill the positions being created by the City's expanding white collar businesses.

These changes are occurring gradually, and with different intensities throughout the West Side. While conditions continue to coalesce for a commercial and residential revival, existing communities have begun to examine their resources and needs with an eye towards preservation as well as new construction. The potential for improving existing transportation and recreational facilities is an important part of this examination, and a critical factor in the long term viability of both the West Side and the City.

West Midtown

In the West Midtown area between the Lincoln Tunnel and 59th Street, the community of Clinton has undergone significant change over the past 60 years. The dramatic rise of the Midtown business district, the construction of major transportation facilities in the area, and the decline of waterfront commerce have gradually focused attention on Clinton as a potential location for offices and middle and high income residences. While the old core community centered between Eighth and Eleventh Avenues experienced declines in both population and dwelling units during the 1960-1970 period, new construction in adjacent areas such as Lincoln Center continue to flourish. In addition to real estate speculation, demolitions, and the proliferation of parking lots in Clinton, traffic congestion and negative air and noise conditions impede the environmental quality of the area, just as the street railroad did 100 years earlier. New waterfront developments such as the Convention Center and the Consolidated Passenger Ship Terminal, while furthering the commercial objectives of the City, have raised serious questions from local residents, especially with regard to traffic and new development. Recently the community has taken steps to counter what it perceives as destructive outside influences by proposing its own plan for the area, securing a special zoning district, and encouraging development of the Clinton Urban Renewal Area. In sum, the West Midtown area is undergoing fundamental changes in its physical character, population, and function, which are likely to be determined by prevailing trends and conditions, rather than by a new West Side Highway facility.



Lincoln Center

The Superliner Terminal under construction

The elevated West Side Highway opposite Lincoln Towers

To the north of Clinton between 59th and 72nd Streets, adjacent to the 60th Street Railroad yards, public housing made its first appearance on the West Side with Amsterdam Houses in 1948. This effort to eliminate one of the earliest slums in the area was soon followed by several urban renewal projects, which stabilized neighboring institutional uses such as Fordham University, and paved the way for thousands of middle income residents. Since the development of the Lincoln Center complex, the transition from a poverty area to a predominantly white, middle and upper income highrise apartment district has almost been completed. New residential buildings continue to be built in the area and pressures are increasing to extend residential and recreational development over the 60th Street yards utilizing air rights.

Outboard Alternative

The Outboard alternative consists of three major transportation facilities: a six-lane interstate highway, a new transitway, and a reconstructed West Street/Twelfth Avenue. Both the highway and the transitway would be located in new landfill near the pierhead line for a large part of their length between the Brooklyn-Battery Tunnel and West 43rd Street. An exception would occur in Lower Manhattan adjacent to Battery Park City, where the transportation facilities would be located largely in the existing West Street/Marginal Street right-of-way.

The Outboard alternative assumes a significant transformation of the Hudson River waterfront. The existing West Side Highway would be torn down. Likewise, all of the existing waterfront facilities south of 37th Street, including Pier 40, the Morton Street Pier, the Gansevoort Destructor complex and the Chelsea Piers, would also be demolished. In place of the existing mixture of waterfront facilities, there would be 243 acres of new landfill from Battery Park City to west 42nd Street. This newly created land would accommodate the proposed highway and transitway in a depressed, covered and ventilated section, and would provide for a continuous belt of public open space over the highway and along the edge of the Hudson River. In addition, the new landfill between the highway and the bulkhead line could be made available for other uses including housing, as a direct consequence of the transportation project.

In summary, the Outboard alternative would consist of highway and transitway facilities similar in service and operations to the proposed Inboard facilities with the transitway illustrated here as an express bus system. However, the Outboard alternative would be the catalyst for major physical changes on the West Side and would provide the opportunity for systematic and controlled redevelopment of the Study Corridor.

Program Package Components

The primary components of the Outboard alternative program package are briefly described below, and then explained in detail as they apply to each of the four West Side communities.

- The interstate highway would be a six-lane limited access facility and would be depressed, covered and ventilated in newly-created land near the pierhead line for most of its length. In Lower Manhattan, however, the facility would be depressed and partially covered at a location similar to the Inboard plan.

- The transitway would be a depressed and covered facility throughout the length of the corridor, located adjacent to the new highway. The transitway could accommodate either bus or rail systems, and could be converted from an express bus system to rail. An express bus system was initially proposed for this alternative operating from the World Trade Center to West 23rd Street, and then following either an Eleventh Avenue or Twelfth Avenue alignment northward to the George Washington Bridge, as described in the Inboard alternative.

- West Street/Twelfth Avenue would be reconstructed in its present right-of-way as a service road, providing for three lanes of traffic in each direction. It would be a continuous at-grade street designed to accommodate local traffic and to provide parking and storage areas where feasible.

- Full directional interchanges are proposed at the Brooklyn-Battery, Holland, and Lincoln Tunnels, and connections would also be provided with the Battery Park Underpass, West 14th Street and back to the existing West Side Highway at West 43rd Street.

- It is estimated that 243 acres of new land would be created by the Outboard alternative, only 40 of which would be utilized by transportation facilities. About 75 acres could be developed for recreation and open space along the edge of the River as part of the construction cost and activities of the Project, and 128 acres would be available for other types of development.

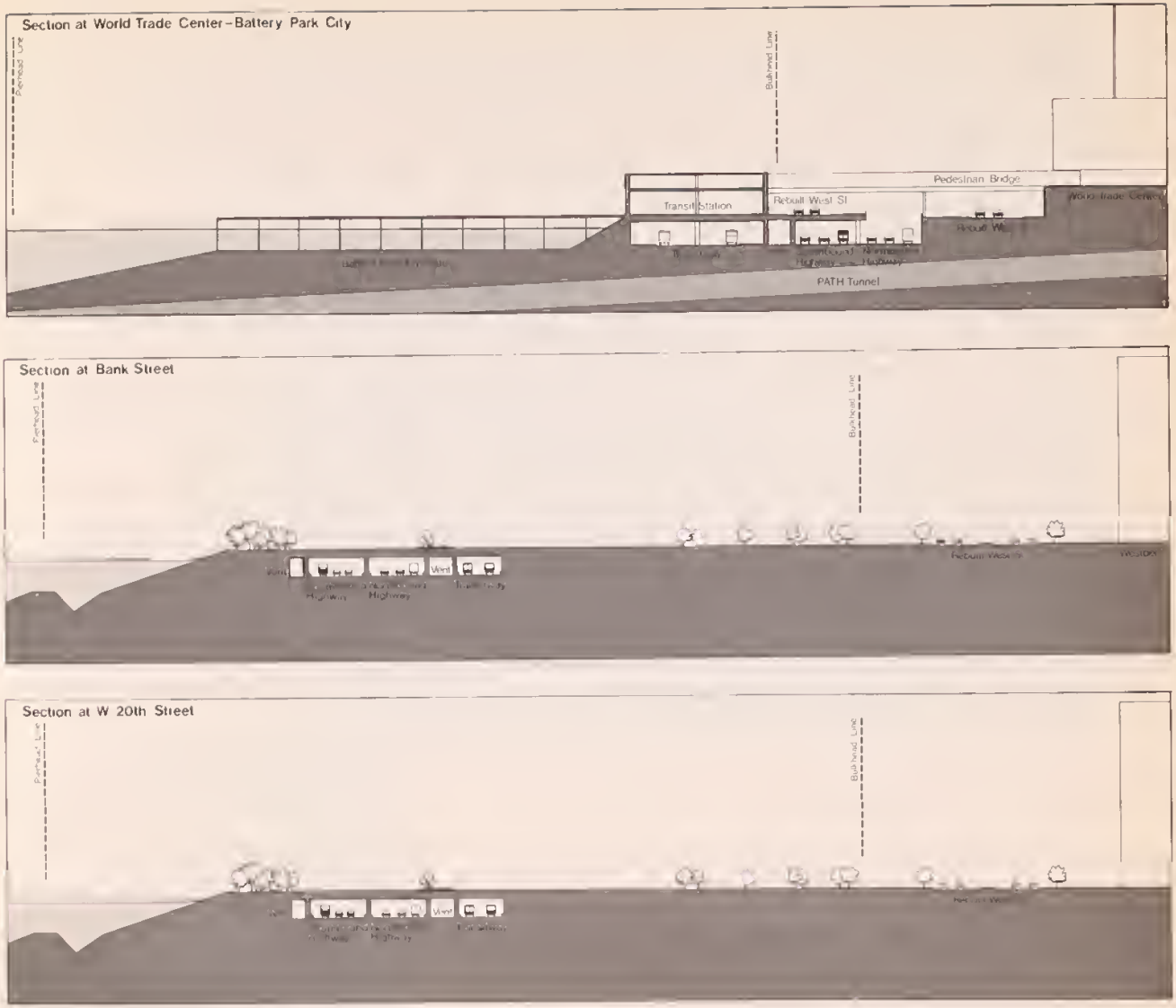
Alternative Holland Tunnel Interchange

Alternative Lincoln Tunnel Interchange

West Side Highway Project Outboard Alternative

- Existing Highway Facilities
- Proposed Highway Facilities
- Proposed Transitway (Covered)
- Proposed Transitway (Uncovered)
- Existing Public Park Lands
- Proposed Public Park Lands
- Project Study Corridor

North



Outboard Alternative Representative Sections

Lower Manhattan

In Lower Manhattan, both the highway and the transitway would be underground and would follow the existing West Street-Marginal Street right-of-way between Brooklyn-Battery Tunnel and North Moore Street. The highway would also have underground connections to the Battery Park Underpass. The transitway would start from an underground station located west of the southbound roadway, adjacent to Battery Park City and the World Trade Center. Both highway and transit facilities would be covered, except for the northbound lanes of the highway, which would remain open in order to facilitate ramp access and ventilation.

In order to provide for local traffic and pedestrian circulation, a network of surface streets, bridges, and elevated pedestrian walkways are planned. These facilities would include a reconstructed West Street, providing three lanes of traffic in each direction. Between the highway and the local street network, access ramps are proposed at Battery Place, the intersection of Trinity and Greenwich Streets, and at Rector and Barclay Streets. At North Moore Street, the highway would enter an open and depressed section and would start to rise and swing out toward the pierhead line in the new landfill. The transitway would drop down and pass under the highway lanes at approximately Vestry Street and continue north parallel to the highway, but now on its eastern side.

The Holland Tunnel interchange would be a major facility in this area. Two alternative designs are under consideration for this interchange. One alternative would utilize two separate corridors to accommodate elevated ramps to and from the tunnel portals. The other would place all ramps in one corridor above Canal and Hudson Streets. Approximately 47 acres of new land would be created in the interchange area to accommodate transportation facilities, as well as a proposed ventilation building at North Moore Street and a proposed City Sanitation Department facility at Canal Street. The Sanitation Department facility would comprise a relocated Marine Transfer facility and space for other uses, including the parking of buses if an express bus transit alternative is selected. An additional 13 acres would be available for open space along the River between Battery Park City and Canal Street.

Greenwich Village

Along the Greenwich Village waterfront between Canal Street and 14th Street, the highway and transitway would become depressed and covered in new landfill near the pierhead line. Access ramps between the highway and West Street would be provided at Canal Street. Within this area, the section of the facility from Houston to 14th Streets would be totally covered, and ventilation buildings for it would be located at each end. This alignment and configuration would provide 37 acres of continuous public open space along the Village waterfront, permit unhindered pedestrian access to the edge of the water, and would make possible a wide range of activities and development opportunities on 54 acres of newly-created land between the highway and the existing bulkhead line.

Within the right-of-way of West Street-Marginal Street, the existing highway would be demolished and West Street would be reconstructed to provide a service road with three lanes of traffic in each direction, separated by a median. This street would connect with existing cross-town streets, and a 50-foot buffer strip would be provided between it and the existing building line.

In order to help alleviate the heavy truck congestion around the Gansevoort-14th Street Meat Market, the existing alignment of West Street-Twelfth Avenue would be moved to the west, eliminating the tight curve and providing additional truck parking and loading areas. Within the Meat Market, the existing 14th Street would be widened to provide space for market truck loading and parking space. New street lanes would be created by acquiring and demolishing the buildings along the north side of 14th Street between West Street and Ninth Avenue. The affected businesses could be relocated within the existing market area. The new 14th Street traffic lanes would be extended west at grade into the landfill area to a location near the highway-transit facilities, close to the pierhead line.

Direct access ramps would be provided between the highway and the new 14th Street and West Street. Ramps from the transitway for an express bus system would be integrated with the highway structure in order to provide access to 14th Street and cross-town distribution routes. Related facilities at 14th Street would include ventilation buildings servicing covered sections to both the north and south of the area, and possible relocation sites for police and fireboat facilities which would be displaced from their existing location at the Gansevoort Pier.

Chelsea and Clinton

From 14th to 27th Streets, in the area of the Chelsea waterfront, the highway would continue in a depressed, covered and ventilated section near the pierhead line. Similar opportunities for open space along the River and offshore development would be possible along the Chelsea waterfront. In this area, 22 acres would be provided for a continuous park along the River, and 25 acres would be available for other types of development. The reconstruction of West Street-Twelfth Avenue would also proceed in the same manner adjacent to the Chelsea Triangle as in the West Village.

At 23rd Street, the transitway would either swing east and continue north under Eleventh Avenue, or remain in the highway alignment to 42nd Street and then continue under Twelfth Avenue. In the case of an express bus system using the Eleventh Avenue option, access to and from the transitway would be provided at 23rd Street and near 41st Street in the vicinity of the Lincoln Tunnel plaza and the Port Authority Bus Terminal. These ramps would serve proposed crosstown distribution routes.

At 27th Street, the Outboard highway would leave the depressed and covered section and rise to an elevated configuration to provide for connections to the Lincoln Tunnel. Two single corridor configurations are under consideration for this connection—one at 30th Street and the other at 35th Street. Both would provide direct connections to the tunnel portals by way of elevated ramps, as well as direct connections to the local street network by way of West Street-Twelfth Avenue. In the interchange area, 38 acres of new land would be created and provision made for continuous public access to the edge of the River, and the location of a replacement Marine Transfer Station for the City Sanitation Department. North of the interchange ramps, the highway would connect into the existing West Side Highway at approximately 42nd Street.

Hamilton Heights begins at 140th Street and is similar in character to Manhattanville except that it is predominantly a Black neighborhood with a growing Spanish-speaking population. During the past 15 years only two highrise projects have been built in the area. Recently, the City has undertaken the study of 145th Street for possible commercial and residential redevelopment leading to the future Riverbank State Park. At present the waterfront park from 145th to 155th Street is used extensively by residents who own cars, but pedestrian access to the facility is extremely difficult.

Access at 158th Street

From Trinity Cemetery at 155th Street to the George Washington Bridge at 179th Street marks the final section of the Upper West Side study area. Known as Washington Heights, the location of this community between Fort Washington and High Bridge Park has always attracted middle income residents, many with Irish and Eastern European backgrounds. More recently, population characteristics are slowly changing as Black and Spanish-speaking families take up residence in the area. Columbia Presbyterian Hospital and cooperative middle income housing developments on Riverside Drive offering scenic views of the Hudson have helped to stabilize housing west of Broadway. Although Fort Washington Park extends along the river south of the bridge, access for adjacent residents is difficult with entry points at 155th Street and 158th Street and only one other entry point immediately south of the George Washington Bridge at 176th Street which consists of a steep path winding between the existing highway and bridge access ramps.

access at 175th Street

access at 153rd Street

to Fort Washington Park

Transportation

A transportation network in all its ramifications is both a product and a reflection of the society it serves. In New York it is a result of the needs and desires of a population which carries on a very complex set of activities around the clock every day of the year.

In turn this need primarily is a function of the number of people and the things they do—work, shop, carry on social and recreational activities and consume the goods and services which sustain an urban society.

The proposal to reconstruct the Miller Highway and Henry Hudson Parkway from Midtown Manhattan to the George Washington Bridge would modify one link in a complex network of transportation facilities and services. It would provide a small and incremental change in the regional transportation network viewed as a whole. It would provide a significant change in the portion of the transportation system which serves Manhattan.

The West Side Highway, particularly the Henry Hudson Parkway, carried the highest volume of traffic of any street or highway in Manhattan until it was partially closed in January, 1974, because of its dangerously deteriorated condition.

Thus, this proposal for discussion is designed to bring information to bear on the question of whether Manhattan's most important highway should be reconstructed or repaired and maintained.

In order to consider these options, it is necessary to understand the role of the Henry Hudson Parkway as a part of the transportation network. And it is equally important to understand the relationship of the Upper West Side to the entire region of which it is a part.

The portion of Manhattan north of 60th Street historically has been a primary residential area for the concentration of business and employment in the Central Business District which extends from Central Park to the Battery. It is the biggest employment center in the United States with more than 2.1 million jobs in an area of nine square miles. Upper Manhattan continues this historic role as a residential area, but in both absolute and relative terms it is becoming less important as the home for CBD workers.

Traffic on the Henry Hudson Parkway

Manhattan's resident population decreased by 13.4 percent between 1950 and 1960 and dropped another 9.4 percent between 1960 and 1970. Most of the decrease in resident population occurred in Upper Manhattan. This occurred while the New York region as a whole gained more than two million in residential population and is the result of smaller family sizes per dwelling unit, abandoned housing stock and replacement housing at lower densities.

Thus, Manhattan and particularly Upper Manhattan has played a declining role for more than 20 years as a residential area for the region.

Population projections for 20 or more years into the future strongly indicate that this downward trend will continue, but at a significantly decreased rate. In fact, although Manhattan's population has continued to decrease since World War II, some areas of the island showed a marked trend toward population stability in the decade between 1960 and 1970.

The West Side Highway Project, as a part of its study for the area between the Battery and Midtown, projected a total Manhattan population of between 1.4 and 1.5 million in 1995. This compares with a 1970 population of 1.539 million.

It is expected, however, that there will be a marked shift in the island's residential population patterns with an increase in population in the area south of 60th Street and with a continued decline in population north of the Central Business District. This forecast results from a detailed analysis of projections by the City Planning Commission, the Tri-State Regional Planning Commission, the Port Authority and the Regional Plan Association. The biggest factors in this projected population increase for the CBD is the development of housing in urban renewal areas as well as wholly new developments such as Battery Park City and Manhattan Landing. No large comparable developments are in the planning stage for

Upper Manhattan. Thus, the loss of old residential units is expected to occur at a faster rate than new housing units are constructed. For example, there was a net decline of some 13,000 housing units in Manhattan between 1960 and 1970 despite the construction of about 100,000 units during the decade. Manhattan has the city's oldest housing stock with about two-thirds of its units built prior to 1939.

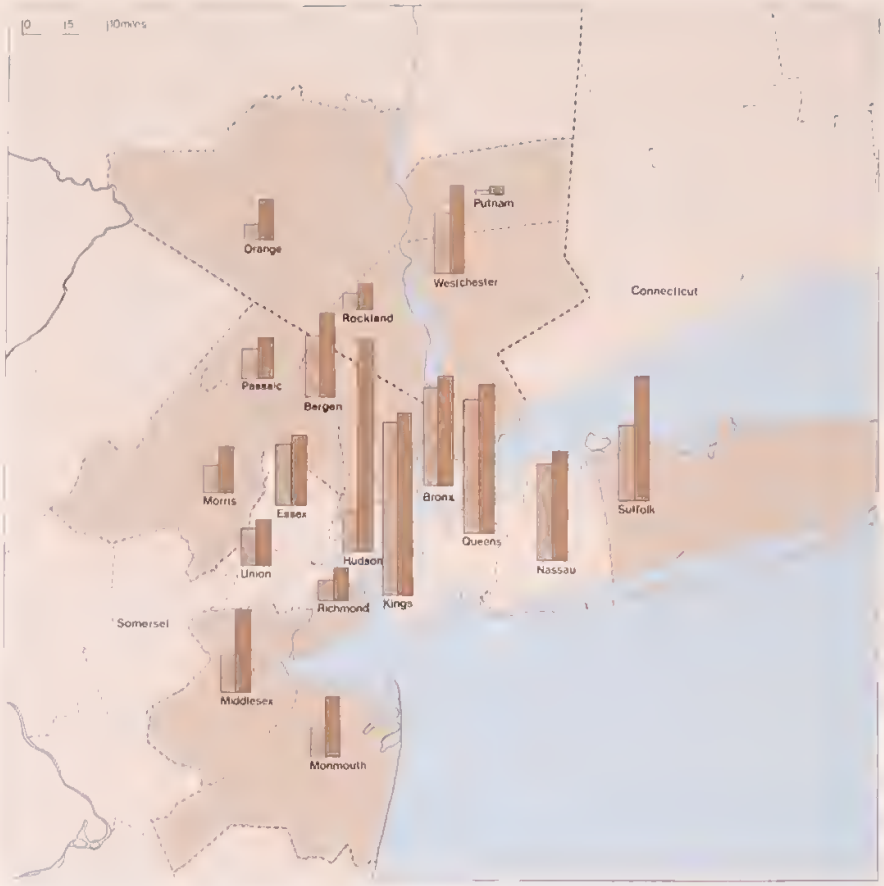
While Manhattan's resident population has been decreasing by significant amounts, the Central Business District continues as a largely stable center of the region's economic activity.

As measured in employment, Manhattan gained in the decade between 1960 and 1970 by about 1.6 percent with a total of more than 2.5 million jobs. Employment in Manhattan as elsewhere is subject to cyclical business activity and the currently estimated employment is about 100,000 jobs below the 1970 level.

The approximate stability in employment, however, tends to mask a significant change in types of employment. In the decade between 1960 and 1970, there was a loss of more than 100,000 manufacturing jobs, which amounted to a 20 percent decline in this job category, and a decline of nearly 13,000 wholesale trade jobs or about five percent of that employment category. These declines, however, were more than offset by increases of more than 140,000 service jobs and an increase of nearly 77,000 in the employment category of finance, insurance and real estate.

These employment trends are expected to continue, but with a significant reduction in the decline of manufacturing jobs and a moderate but steady increase in office employment.

The importance of the Central Business District, measured in another way, is that the nine square miles of Manhattan below 60th Street and the daily activities of this area produce 71 percent of all of New York City's revenue from income tax and 48 percent of its revenue from real property taxes. Thus, the continued viability of the Central Business District is critical to the City's ability to continue providing the facilities and services upon which its population depends.



Regional Population Trends

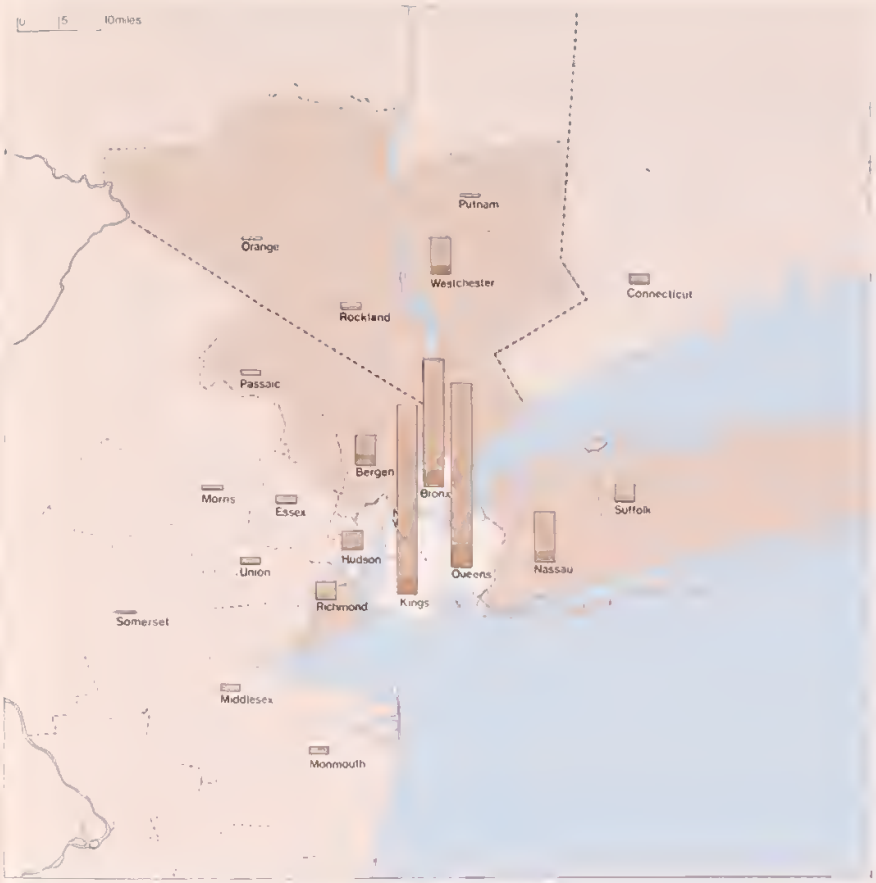
1970 Population

1995 Projected Population

Counties Growing by 30% or More

(1 inch of bar height equals 2,000,000 people)

North



Journey to Work Trips into the Manhattan CBD by County in 1971

Trips by Autos

Trips Made by Other Modes

Counties with 20% or More Auto Riders

(1 inch of bar height equals 250,000 trips)

North

Morning rush hour

The pattern of population and employment described above are two of the most important factors in analyzing the changes which have occurred in past years in how people and goods travel from place to place. Additionally projections for the future 20 or more years also are heavily influencing factors in how people and goods will travel in the future. Other critical factors include income, the extent of vehicle ownership, the level of investments in transportation facilities and services and a potential series of policy regulations which government may or can adopt to regulate more rigorously how and under what conditions people and goods are transported.

The dominant factors, however, which will heavily influence transportation between Manhattan and the rest of the Region is that resident population is growing in the outermost suburbs while the Central Business District continues to be an attractive center for business, shopping, and social and cultural activities.

The proposal contained in this report for a reconstruction of the Henry Hudson Parkway and the construction of a transitway along the entire West Side of Manhattan represent the potential for important links in the transportation network.

Despite the fact that New Yorkers in comparison with residents of other American cities rely overwhelmingly on public transit, they are similar to their counterparts in every other section of the nation in that they have relied more heavily on the automobile in recent years, including getting to and from work. Although on a relative basis there is much greater reliance on the auto for journey-to-work trips in the suburbs, City dwellers also increased their usage of the auto.

There have been both relative and absolute increases in auto travel and decreases in public transit patronage during the past decade, particularly in those areas not well served by transit. Much of the recent suburban growth has been between the radial transit corridors emanating from Manhattan, and circumferential transit service connecting these newer suburban communities with the radial transit spokes has not kept pace. Hence, even if people living in these areas want to use transit, they have to make part of their trip by automobile, and will continue to do so for some time into the future.

While the City resident can choose among an extensive array of public subway, bus and taxi services, the suburban dweller has a much more restricted choice of transport mode. Although mass transit services are available in the suburbs, their attractiveness relative to the automobile in terms of time, cost and convenience is not sufficient to attract very large ridership.

Several other factors have had a strong impact on the number of daily trips made, the kinds of trips made, and the mode of transportation selected by travelers. Median household income rose in each sub-area of the region, with the largest increase occurring in the outer suburbs. Auto ownership and multi-car households increased, primarily in the suburbs, where there were an additional 1.4 million automobiles.

Notwithstanding the heavier reliance on motor vehicles, Manhattan is the center for all public transit movements in the New York metropolitan area, as well as the locus of the regional economy. So many jobs in so compact an area is possible primarily because of the large public transit system which moves people to and from their jobs in the CBD every day. More than half of all subway trips each day originate in Manhattan, and nearly a quarter of them both begin and end in Manhattan. Subway service, with the exception of the Port Authority Trans-Hudson (PATH) line to New Jersey, is limited to the five boroughs of New York City.

Most commuter rail service is provided to people residing north of Manhattan, in Westchester County and Connecticut, and east of Manhattan on Long Island, with only limited commuter rail service west across the Hudson to New Jersey. The regional bus network provides three types of service—commuter, express and local, which differ in pickup and discharge operations in Manhattan. Commuter buses carry passengers from sections of New Jersey and New York State to and from the Port Authority Bus Terminal and the George Washington Bridge Bus Station. Express bus service from the Bronx, Queens, Brooklyn and Staten Island carries passengers non-stop to designated stops on Manhattan streets near their places of work. In addition to local buses, Upper West Side avenues such as Columbus and Amsterdam are regularly used by inter-city buses.

Commuter Rail Network in the New York Region

Existing Lines

Proposed Lines

North

Express Bus Network in the New York Region

Existing Lines

North

Despite increased auto usage during the past decade, the great majority of people traveling to Manhattan and its CBD still rely on mass transit. In 1971, 79 percent of all daily person trips to Manhattan were made by transit. During the morning rush period 85 percent of the people arriving in Manhattan came on the transit system. More than 40 percent of the people arriving in the CBD by transit came from north of 60th Street, as did almost half of the motor vehicles.

Although there was some shift from transit to auto by CBD-bound travelers, the absolute number of daily person trips to the CBD remained nearly equal in the period between 1963 and 1971. The major portion of the slight drop which occurred was in the off-peak hours. Most of the loss in transit ridership happened in the non-rush-hour periods. The lower off-peak period usage of transit is substantiated by the fact that nearly 60 percent of all daily subway passenger arrivals in 1971 occurred in the morning three-hour rush period.

The decline in total and peak period CBD subway passenger arrivals results in part from the shifts in the work force and population in Upper Manhattan. However, other interrelated factors were also influential. Increased personal income, relocation of homes and jobs, and greater availability of automobiles in the Region combined to reduce subway usage. In addition, fare increases and the deterioration and reduction of service, especially in the non-rush periods, also contributed to this drop in subway patronage.

Commuter rail lines, however, increased their patronage between 1963 and 1971 if the demise of the trans-Hudson rail ferries is not considered. This increase in commuter rail usage reflects the residential movement away from the core in combination with an extensive modernization program carried out by the Metropolitan Transportation Authority during the past five years.

Bus passenger arrivals in the CBD increased during the morning peak period, but off-peak bus arrivals fell. This peak period increase has been attributed to the establishment of new express bus routes which provide a premium service for which they have been able to command a premium price.

While fewer people came to the CBD by transit from north of 60th Street, more auto and taxi riders arrived from this direction in 1971 than did in 1963 There was a slight decrease in truck arrivals between 1963 and 1971 Nearly half of the vehicles entering the CBD on a typical weekday in 1971 came into the CBD from north of 60th Street. Importantly, only about 25 percent of all vehicular arrivals in the CBD were in the morning peak period which emphasizes that motor vehicle travel is spread much more evenly throughout the 24 hour period Autos and taxis are used extensively during the time of day when people are making shopping, social, recreational and entertainment trips.

The trends of the past are only a starting point for what will occur in the future Future projections for the growth and distribution of population and employment, increase in personal income, growth in ownership of automobiles, costs of transportation will be the determining factors

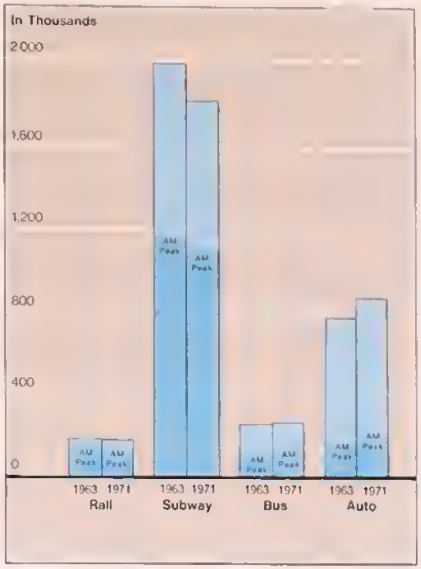
The demographic forecasts used for this proposal are the same as those developed for the West Side Highway Project between the Battery and Midtown. They are discussed in detail in the Draft Environmental Impact Statement for the West Side Highway Project

The critical forecasts are for population, employment, autos available to Manhattan residents and constraints on the use of automobiles by reason of more stringent regulation of parking

The decline in population in Manhattan is expected to moderate in the 20 years to 1995 with an actual increase of from 24,000 to 100,000 in the area south of 60th Street This is due principally to the several large residential projects which are now being planned or are underway Upper Manhattan is expected to continue its decline from an estimated 959,000 in 1972 to a level between 840,000 and 860,000 in 1995

Employment in Manhattan, however, is expected to continue growing slightly with increases of between 110,000 and 221,000 jobs by 1995 Although these increases seem large, they represent growth of from 4 4 percent to 8 9 percent. The lower end of the growth range would actually mean no growth because it would be approximately the same level of employment as experienced in 1970 before the economic downturn of the past two or three years Employment, like population, is expected to increase in the CBD with a continued decline of approximately 30,000 jobs in Manhattan north of 60th Street

The increase in median income plus a projected parking policy which will give high priority to residential population is expected to result in an increase in auto ownership and, therefore, autos available to Manhattan residents

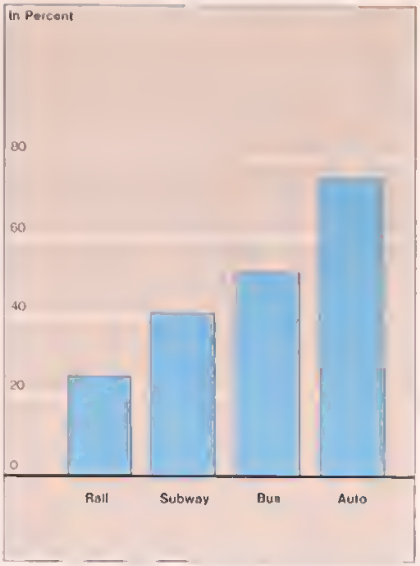


Persons Entering the Manhattan CBD Daily by Mode; 1963, 1971

The projected parking policy will attempt to continue to provide adequate off-street parking space for Manhattan residents in all new construction, but will severely limit commercial space used largely by commuters and person trips to Manhattan for social, recreational, shopping, cultural and other purposes.

It is expected that the number of autos available to Manhattan residents will increase from 159,000 to between 180,800 and 189,300 by 1995 Most of this increase is expected to occur in the area south of 60th Street where the predominant new residential construction and increased population is forecast.

The above stated factors are expected to result in an overall increase in average daily person trips in Manhattan from 3,503,000 in 1972 to a range of 3,676,000 to 3,836,000 in 1995—increases of about 173,000 to 333,000 These increases, however, are entirely in the CBD, because there is a forecasted decrease in Upper Manhattan of about 30,000 person trips on an average daily basis This results primarily from the reduced population and employment forecast for Upper Manhattan in the next 20 years



Persons Entering the Manhattan CBD in the Off-Peak as a Percentage of Daily Totals by Mode, 1971

The vast majority of these person trips in the future, like at present, will be by public transportation. In fact, this proposal, like the West Side Highway Project, anticipates the long experienced decline in public transportation will be reversed in the coming years, partially as a result of large investments in new and improved mass transit facilities and services and partially as a result of more stringent controls on the use of automobiles.

Even with these improvements however, this proposal forecasts a moderate increase in the use of automobiles in Manhattan in future years, but at a rate significantly less than has been experienced in recent years The increase over the next 20 years is expected to be between 58,000 and 71,000 on an average daily basis This increase is on a present day base of more than 500,000 of the 3.5 million average daily person trips

Comparatively, the increase in the use of public transit to the CBD is forecast to range from about 115,000 to about 250,000 on an average daily basis These increases in the use of public transportation are expected during the peak hours for journey to work trips, similar to the patterns today The increased economic activity in the Central Business District also is expected to produce more taxi and truck trips to serve the bigger employment center

These projected increases into and within the CBD, however, have unusual relationships to Manhattan north of 60th Street. The decreases in population and employment north of 60th Street will generate fewer person and goods trips to and within Upper Manhattan by auto, taxi, truck and transit. However, because a high percentage of person and goods trips to the CBD pass through Upper Manhattan, the higher level of economic activity in the CBD will produce off-setting increases in volumes of all kinds of traffic as well as transit. The increases in the use of public transportation are expected during the peak hours for journey to work trips, similar to the patterns today. The forecast of a reversal in the downward trend in transit usage and a future growth in ridership is dependent in part upon the completion of the several transit improvement projects now underway or in advanced planning. Those include completion of the Second Avenue Subway, direct access into Penn Station by New Jersey commuter rail lines, direct access of the Long Island Railroad into an eastside Midtown Terminal, completion of the 63rd Street tunnel and extension into Queens, extension of PATH to Plainfield, N.J., and other improvements such as new, high performance equipment. The analysis also includes the potential transit improvements which are a part of this proposal; a transitway utilizing either rail or express buses. The actual estimates of how people will travel in the future are based upon a modal split analysis. This analysis utilizes a mathematical formula in which travel time and cost are the most significant factors. Therefore these transit improvements as well as the highway proposal are important in terms not only of increased transit usage, but also in terms of the forecast of Manhattan employment because both the quantity and quality of transportation will be a significant factor in business decisions on whether to stay in Manhattan or relocate elsewhere.

Estimates of goods movement by truck is dependent almost entirely on the projected level of business activity. Manhattan has experienced a significant decline in recent years in manufacturing and wholesale trade which has resulted in reduced traffic. This has been offset, in part, however, by an increase in office employment which has created more demand for service truck trips involving maintenance and repair, the delivery of office supplies and food and the removal of refuse.

A projected leveling off in the decline of industrial and manufacturing activity and an increase in service business activities will result in a reversal in this decline and an increased level of truck travel in the future. The estimated increase for 20 years ranges from 2.5 percent to 10.4 percent.

There are, of course, other factors which may influence both the amount of future travel and the way people and goods travel. One such factor is the requirement that the City improve air quality to meet Federal standards. The Air Quality Implementation Plan approved for the City contains several strategies which would reduce the use of motor vehicles for the next several years until all new vehicles manufactured meet the Federal standards. The Plan, however, explicitly states that the "core of these strategies is the replacement of older cars with 1975 and later models which are required by Federal law to have very low emission rates." Once the required emission levels are reached, the plan contains no specific long range strategies which would control the use of motor vehicles.

The movement of heavy trucks over the Upper West Side avenues and streets represents a significant portion of all traffic because the truck arteries are concentrated on the few streets available to them between the parks.

Congestion on Amsterdam Avenue

The vehicle miles traveled by heavy trucks (those with six or more wheels) represents 9.5 percent of the traffic for the entire portion of Manhattan north of 60th Street. However, the amount of heavy truck travel west of Central Park increases to 13.1 percent of the total. And of the total traffic entering the Central Business District on a 24-hour basis on all streets between Central Park and Riverside Park, 20 percent is heavy truck traffic.

The overwhelming portion of heavy truck travel is concentrated on just four major thoroughfares—Columbus, Amsterdam, Broadway and West End Avenue. Of the total 24-hour traffic entering the CBD on Columbus Avenue, 27.1 percent is heavy truck traffic. The same percentage applies to Amsterdam Avenue for northbound traffic leaving the CBD. Of total traffic volumes on Broadway, 15.6 percent of the southbound traffic is made up of heavy trucks, and 19.8 percent of the northbound traffic. West End Avenue traffic is made up of 15.5 percent heavy trucks in southbound movements, and 16.8 percent in northbound movements.

A more direct and measurable control on the use of autos is the amount of parking which is made available as a matter of City policy. The City Planning Commission during 1973 proposed a new policy which would cut in half the amount of parking which could be built as part of new residential construction and would allow additional commercial space only on a case by case basis in which it would be necessary to show that the parking space was directly related to the business activities in a new building and would not be available for commuter parking. While this policy has not been promulgated at the time this is written, the City and State Department of Environmental Conservation are attempting to work out detailed rules and regulations before formal issuance. For the purposes of travel forecasts in this proposal, it was estimated that there would be a net increase of 14,000 parking spaces in the area south of 60th Street, more than 80 percent of which are in major projects already approved or in advance planning. The reduction in the amount of parking space which could be built in residential buildings was assumed to apply to the entire island.

The severe problem of energy which the nation and the New York metropolitan region will continue to face into the future is a factor which obviously will influence transportation, but its dimensions in terms of this proposal are impossible to forecast precisely. The explicit national policy at the time this is written is that free market conditions will prevail and that no regulatory controls such as rationing will be imposed. If this policy is continued into the future, the net effect upon vehicular travel into and within Manhattan will be minimal. Cost of fuel rather than availability will then be the determining factor.

A recent study completed for the Federal Environmental Protection Agency and the Council on Environmental Quality indicated that a one percent increase in the cost of gasoline would result in 0.3 percent decrease in purchasing. This relationship, or price elasticity, is higher than previous research analysis in this area. Earlier research indicated a one percent increase in price would result in a 0.1 to 0.2 percent decrease in purchasing. However, a one percent increase in personal income would cause a one percent increase in sale of gasoline. Notwithstanding the recent sharp increases in gasoline price, over the long term the price of gasoline would have to increase at a rate three times the growth in personal income just to keep the sale of gasoline at its present level. The increased cost of gasoline also is being offset to some considerable extent through the significant increase in the purchase of smaller fuel-efficient autos and this is expected to continue

Existing Conditions

The West Side Highway constructed in the 1930's was not designed and built to accommodate the volume of traffic which has utilized this facility in recent years.

More than 35 years of age and wear have taken their toll with significant portions of the West Side Highway closed to traffic for an indefinite period. The Henry Hudson Parkway is shut down from 72nd to 79th Streets and a portion of the Parkway in the 96th Street Interchange area has been modified with temporary construction in order that two lanes of traffic can be maintained in each direction because of structural weaknesses in what normally would be the three-lane northbound roadway. The entire section of the Miller Highway from the Battery to 46th Street is closed for an indefinite period pending a structural inspection report, and periodic problems occur on the section from 46th Street to 72nd Street with a recent failure of one of the 46th Street Interchange ramps as an example.

The City Transportation Administration has underway at the time this is written a detailed field inspection, the report for which will make recommendations for repairing the entire West Side Highway south of 79th Street. The first priority is on the section from 72nd to 79th Streets with the other sections to be inspected over a 10-month period in 1974.

Detailed reconstruction or repair plans cannot be developed until the inspections are completed. A conservative estimate, however, is that it will cost several millions of dollars to repair the Henry Hudson Parkway sufficiently to reopen it to traffic, and the necessary reconstruction probably will take at least 18 months.

In recent years the City has been experiencing rapidly escalating costs of merely repairing and keeping the highway open to traffic. The City spent $1.3 million in 1971 to make repairs to the section from 56th Street to 72nd Street. An additional expenditure of about $1.5 million for repairs was being made in the area immediately south of 14th Street when a section of highway collapsed in December, 1973. An additional section in the vicinity of 145th Street is under design for major repair work at a cost of nearly $2 million. None of the above cited major repair projects include any of the sections which are now under detailed inspection because of severe structural deterioration.

These major reconstruction and repair costs may be compared with an estimated normal annual maintenance cost of $75,000 to $100,000 according to Transportation Administration records.

The highway closed at 79th Street

New York Times Photo

forcing traffic onto local West Side streets

The major maintenance expense problems occur in areas in which the highway is elevated. North of 42nd Street, these elevated sections are located between 42nd and 79th Streets, the northbound lanes between 94th and 98th Streets, 125th and 135th Streets, and north of 145th Street. (The sections between 72nd and 79th Streets and between 94th and 98th Streets appear to be at grade. In actuality they sit 60 feet above the Penn Central Railroad viaduct with the park land mounded up on either side.) In these sections, the highway was constructed on a steel structure over which a reinforced concrete deck was placed as a road surface. Two types of major repairs have proven to be frequently needed. The more common and less costly repair deals with holes caused by slab failure in the roadway deck over the steel structure. These holes, averaging 18 inches in diameter, have been developing in the deck at an increasingly rapid rate since 1970. Steel plates are normally placed over the holes as a temporary repair measure. However, when there are a series of plates over a short stretch of roadway, the roadway deck must be completely replaced with new precast slab units.

The less frequent but more critical type of repair deals with the supporting steel structure. An asphalt truck falling through the northbound lanes of the highway in the vicinity of Gansevoort Street on December 15, 1973, triggered an emergency City and State inspection of the highway structure. The weight of the truck had caused several badly deteriorated steel beam connections to fail. Finding similar conditions at various locations in the vicinity of this area necessitated the closing of the highway below 23rd Street. Further inspection between 23rd Street and 46th Street revealed areas of deterioration similar to those at the collapsed section, and the City was forced to close the entire highway from the Battery Tunnel to 46th Street.

After inspections south of 46th Street were completed, a decision was made to inspect all viaduct sections of the West Side Highway and Henry Hudson Parkway for structural integrity.

The section of the highway between 46th Street and 72nd Street was found to be less deteriorated because of extensive structural repairs in 1971 and it was considered safe. Although there are still some continuing poor slab conditions between 54th and 58th Streets the supporting steel structure was judged sound enough to carry traffic. However, in the elevated section between 72nd and 79th Streets, initial inspections revealed serious structural defects in many of the supporting members at the expansion joints. Water and salt seeping through the joints onto the beams and beam connections had caused deterioration of the steel to such an extent that some members had permanently deformed. If traffic were permited to continue using this section, there would have been a danger of collapse. This section of the Parkway was therefore closed on January 23, 1974.

Deterioration of the highway structure in the vicinity of 79th Street

New York City Transportation Administration Photo

With a traffic volume in excess of 100,000 vehicles per day, this section is one of the most critical on the entire highway. When the detailed inspection is completed, construction plans will be prepared by the City and a contract will be let for the necessary work. The time required for the inspection design and reconstruction of this section has been estimated by the City to be at least 18 months. Although the exact cost of this reconstruction will not be known until the completion of the detailed inspection, estimates have been made which exceed $10 million.

Further north, continuing inspections by City forces have revealed another severe problem area. In the vicinity of 96th Street, portions of the northbound roadway and interchange ramps rest on steel structure over the Penn Central railroad. In this area, the deterioration of the structural steel was found to be severe enough to require the temporary closing of the northbound roadway and some access ramps at 95th and 96th Streets. Northbound traffic, which normally utilizes three lanes, has been detoured partly to the southbound lanes and a temporarily constructed lane. A detailed inspection of the structure in this area has been completed by the City and contract repair plans are being prepared. Design and construction is anticipated to require at feast 18 months at a cost to the City of approximately $3 million.

Further north between 143rd and 147th Streets, holes in the concrete roadway deck have developed to such an extent that it has now become necessary to replace it completely. This work, which would consist of replacing the roadway deck with precast concrete slabs and installing new drainage, centermall and lighting in this area, is estimated to cost the City an additional $2 million.

The closing and restrictions to traffic on Manhattan's busiest highway has caused traffic disruption across the island.

Between 72nd and 79th Street the City Traffic Department, in a recently completed analysis, estimated approximately 70 percent of the traffic diverted to West Side local streets and about 30 percent to the East River Drive. The exact amounts vary considerably from place to place up and down the West Side.

This analysis has been complicated by the fact that closing of sections of the highway occurred at the same time as the gasoline shortage in the late winter and early spring months. Traffic patterns were somewhat different than normal during the months when the shortage of gasoline was most severe. Although gasoline once again became more readily available in April, 1974, the substantially increased price also may have had a continuing effect on what kind of automotive trips people took.

Deterioration of the highway structure in the vicinity of 96th Street

Nothwithstanding the overall decrease in traffic in Manhattan during these months, there was an absolute as well as a percentage increase on certain major thoroughfares. Riverside Drive between 72nd and 79th Streets serves as the detour for the closed section of the Henry Hudson Parkway and as a result was the one most drastically affected by the closing of the Henry Hudson Parkway. For example, the increase in traffic southbound on Riverside Drive between 72nd and 79th Streets over a 24-hour period was 450 percent from 5,800 vehicles per day, to 26,100 vehicles per day. The northbound increase, although severe, was not as great with a 375 percent increase. Even so, in this area more than half of the traffic which normally would have used the Henry Hudson Parkway has been diverted to the East River Drive and the other major arterial north of 96th Street. This diverted traffic chose alternate routes to avoid congestion in the area between 72nd and 79th Streets.

Choosing alternate routes occurred both within Manhattan and on routes to Manhattan from other boroughs and counties east of the Hudson River. Closing of the highway or portions of it seemingly had little effect on the Hudson River crossings at the George Washington Bridge and the Lincoln and Holland Tunnels. However, traffic on the Henry Hudson Bridge and Brooklyn Battery Tunnel, both connecting directly to the West Side Highway, was substantially below the levels of a year earlier. Average weekday traffic at the Brooklyn Battery Tunnel during April, 1974 was down about 13 percent or 6,800 vehicles below the same months in 1973. At the Henry Hudson Bridge, traffic was down about 21 percent or 9,200 vehicles per day from the year's earlier level of 44,400.

Most of these decreases, however, showed up on the other river crossings and on other routes within Manhattan.

The detouring or diversion of traffic to the West Side thoroughfares and to the East River Drive was more severe for northbound traffic than southbound traffic, apparently reflecting the fact that the northbound ramps to the Parkway at 96th Street remain closed although southbound traffic on the Parkway can get off at 96th Street.

In addition to Riverside Drive and the East River Drive, the thoroughfares which show both an absolute and a percentage increase are West End, Columbus and Amsterdam Avenues and Central Park West. Traffic on Broadway has been largely unaffected by the diversion.

It also is apparent from the traffic analysis that traffic on the Parkway which has an origin or destination in Midtown is more likely to divert to other routes to avoid the congestion between 72nd and 79th Streets. Traffic using the Parkway which has an origin or destination in lower portions of Manhattan is more likely to take the 72nd to 79th Street detour on Riverside Drive in order to use the West Side Highway to 46th Street and then continue on 12th Avenue and West Street. ■

The Proposal

The Proposal

The alignment described here represents a proposal for constructing a highway and transit facility along the western edge of Manhattan from 42nd Street to the George Washington Bridge. Although many alternative designs were studied, only one appears to meet the spirit and intent of restrictive state legislation concerning Riverside Park, and the varied concerns of local community groups. In short, this proposal demonstrates a new highway-transit facility which can be designed and built without causing undue disruption to park related activities both during and after construction. In overcoming these constraints, the proposed facility also would eliminate the existing Henry Hudson Parkway and restore its right-of-way to recreational use. This plus the construction of a park facility on the roof of the covered highway would result in significant park expansion and would permit direct access to the river edge along most of the Upper West Side.

The proposal has been developed sufficiently to establish construction feasibility and probable consequences for park land, traffic and the local environment. Attention was also focused on implementation of the facility, especially the degree to which activity during construction might affect traffic maintenance and park land. Detailed design development and impact analysis, which is required by law prior to a public hearing and before any approval of the project, would come only if the proposal is carried forward to the next stage of detailed study, analysis and design.

Basically, the highway facility would consist of a six-lane roadway which could carry both trucks and automobiles, and have full shoulders for accommodating disabled vehicles. It would be elevated adjacent to the waterfront in West Midtown and then enter a depressed, covered and ventilated section constructed in landfill adjacent to Riverside Park from 72nd to 125th Street. From this point, the facility would continue north in an elevated configuration connecting with the George Washington Bridge and the Cross-Bronx Expressway. A mass transit facility would also be provided as a separate express bus or rail transitway. This facility would operate within underutilized portions of Penn Central railroad right-of-way and the existing railroad tunnel under Riverside Park. North of 125th Street, two additional busway lanes could be constructed as part of the new highway facility.

42nd to 72nd Streets

The alignment developed for the section of the study corridor from 42nd to 72nd Street took into consideration major waterfront facilities such as the proposed Convention Center between 43rd and 47th Streets, the new Passenger Ship Terminal under construction from 47th to 52nd Streets, and the Penn Central freight yards from 59th to 72nd Streets. An important factor in this section was the degree to which access to the facility and the provision of a service road would influence traffic conditions in adjacent areas, especially the residential portions of Clinton. In addition, this section must be planned to connect with the various alternates for the West Side Highway improvement to the south of 42nd Street.

Under the proposed alignment, a six-lane elevated expressway would be constructed in approximately the same right-of-way as the existing highway. Twelfth Avenue would be constructed under or adjacent to the proposed highway and new interchanges provided at 57th and 72nd Streets.

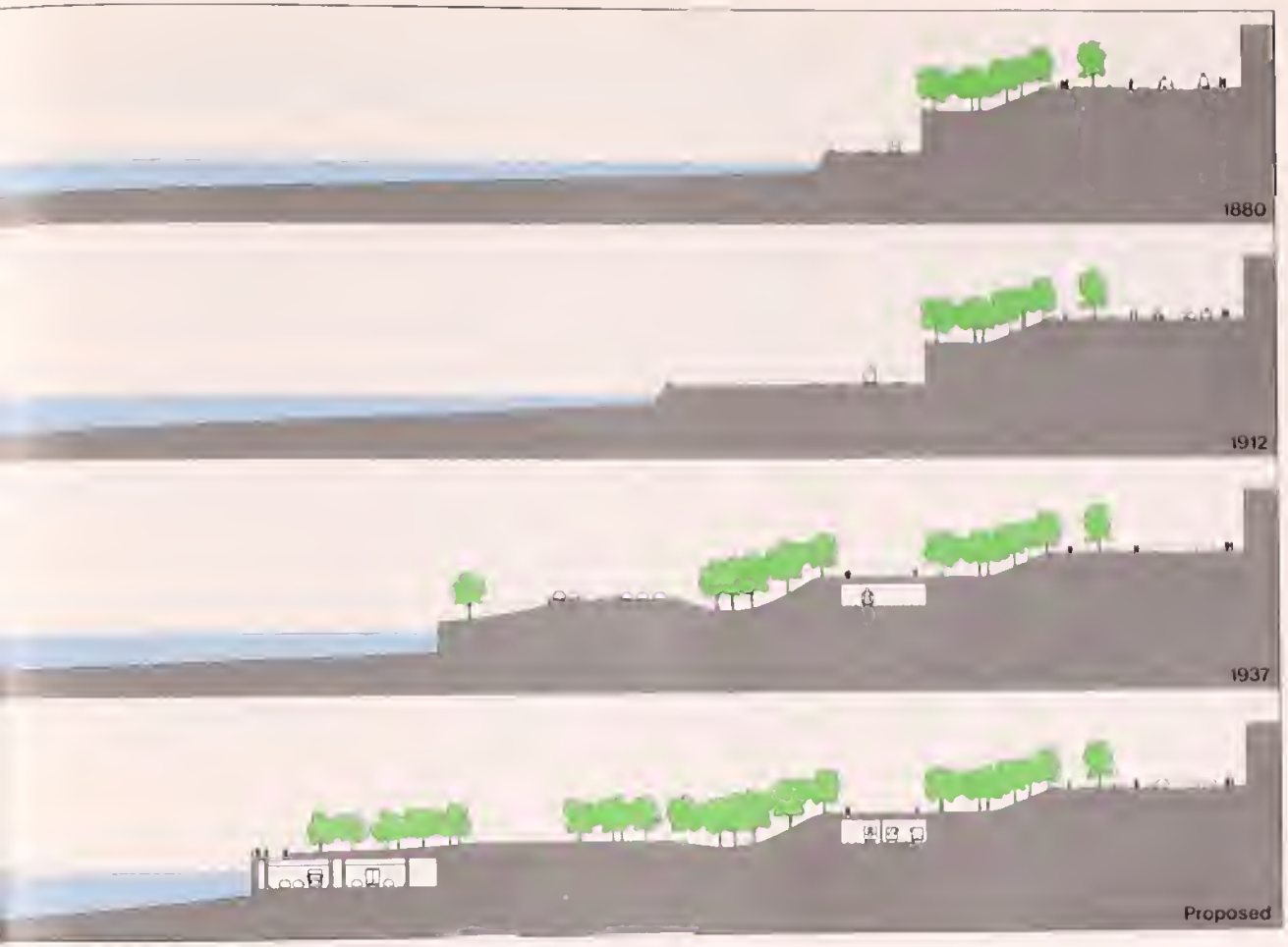
Access to the highway at 72nd Street would consist of a northbound on-ramp and a southbound off-ramp. These ramps would connect directly to Twelfth Avenue (which would be extended through the 60th Street railroad yards) rather than to existing local streets. An extended Twelfth Avenue would parallel each side of the elevated highway providing increased access to this underdeveloped waterfront area and connect to the proposed full-directional interchange at 57th Street. Twelfth Avenue lanes would then come together and continue south under the elevated highway structure.

The proposed highway and reconstructed Twelfth Avenue facilities would require only minor modifications to the Passegner Ship Terminal ramps now under construction between 47th and 52nd Streets. The reconstructed highway would not interfere with the proposed overpass structure connecting the main exhibit area with the balance of the Convention Center construction east of Twelfth Avenue. As proposed in this report, the elevated highway could connect to any of the alternatives proposed as part of the West Side Highway Project south of 42nd Street.

To construct the new elevated highway, a temporary structure is required for northbound traffic on the east side of the existing viaduct from 42nd to 55th Streets. Southbound traffic would be detoured to present northbound lanes; permitting the existing southbound structure to be demolished; the new six-lane structure could then be constructed in the space available.

As part of the proposal in this section of the corridor, a public transitway would be constructed in the depressed Penn Central right-of-way along Tenth Avenue between the 30th Street yards and the 60th Street yards.[1] This facility could accommodate either an express bus or rail transit system that would continue north under Riverside Park, eventually connecting with

[1] Manhattan West Side Corridor Transit Study Technical Report



The Change and Growth of Riverside Park

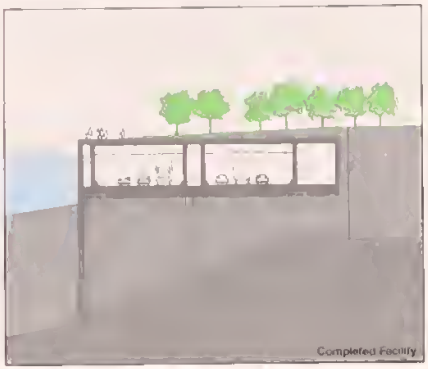
either the George Washington Bridge or commuter terminals in northern Manhattan. Existing rail freight operations could still be maintained in the right-of-way in addition to the new transitway facility.

The study investigated an outboard alignment through Midtown as well as the inboard alternative. If the highway were constructed in an outboard alignment near the Pierhead Line, it would consist of the same facilities as the alignment described above. However, an outboard alignment was not studied in the same detail, and would require additional analysis to establish its feasibility. Substantial work would be necessary to integrate it with the proposed Convention Center and new Passenger Ship Terminal.

72nd to 112th Streets

Because of the restrictive state legislation on existing park land, this section through Riverside Park from 72nd to 112th Street is of pivotal importance in establishing the feasibility of extending the West Side Highway to the George Washington Bridge. It was very early concluded that, to conform to the intent of the restrictions regarding encroachments either during or after construction, the new highway would have to be located predominantly outside the present park, in the space between the present shoreline and the United States Pierhead Line. The Pierhead Line is the western limit of possible construction. The Pierhead Line is established by law to preserve a minimum navigable river channel. This constraint is further complicated because at several points along the shoreline, there is only about 100 feet, and at some points as little as 94 feet, between the Pierhead Line and the present shoreline. This is less than the space necessary for a six-lane divided highway with marginal shoulders for disabled vehicles.

The resolution of this problem can be seen in the typical section adopted through Riverside Park which places the six-lane divided highway as close as possible to the Pierhead Line, and below the level of the present shore. Two other proposals in that location were examined and discarded, one with the highway open at existing grade along the shoreline and another with the highway at existing grade along the shoreline but covered with a deck for new park development.



Construction Staging and Traffic Maintenance through Riverside Park

Double decking of roadways was also considered However, none of these alternative configurations were judged to adequately meet the intent of legislative restrictions

The solution presented eliminates aesthetic deficiencies found in other alternates by lowering the express highway to an elevation about 17 feet below mean high water

The depressed covered roadway consists of twin concrete tubes, set into the riverbed and supported on piles The enclosed structure, with ample side clearances and higher than normal vertical clearance, will give the motorist more the sense of being within a normal highway space covered over than the usual sense of confinement experienced in tunnels Environmentally, however, it must be treated as a special type of covered section that will require a ventilation system

The deck of the concrete box which completely encloses the new highway from 69th to 124th Streets, would create a new continuous level pedestrian promenade extending uninterrupted along the water's edge for a distance of about two and one-half miles The new promenade would be at about the same level as the existing pedestrian walk along the river and would permit direct public access to the water The promenade will not interfere with the view to the river from any portion of the park lands to the east New park areas, including the 63 acres over the new highway structure and the 38 acres created by removal of the existing highway, would be integrated with existing park facilities and developed without disruption of existing park facilities.

At 96th Street, the existing interchange would be replaced in a more simplified form On the river side, the ramps to and from the depressed southbound expressway are formed into a symmetrical archway raised above the promenade level and centered on the new oval interchange The depressed highway and ramp structure do not interrupt the continuity of the pedestrian promenade along the river edge Although an important feature of the new highway is its capacity to accommodate commercial vehicles, trucks would not be permitted access to or from the highway through the 96th Street interchange

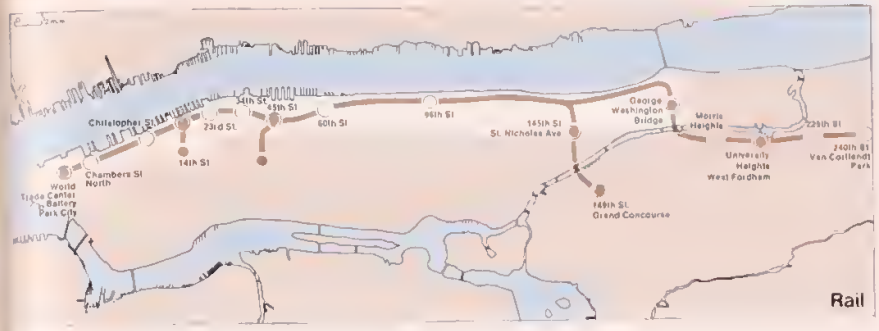
The public transitway in this section of the corridor would utilize the Penn Central railroad tunnel which is located under the central portion of the park from 72nd to 124th Streets If a rail system were selected, little change would be required in order to convert the tunnel to accommodate subway cars However, if an express busway were selected to occupy space presently reserved for rail freight service, the tunnel would be ventilated similar to the covered highway section

As a result of the highway and transitway alignments, and the specially designed structural and environmental features of these facilities, traffic noise in this section of the park would be significantly reduced, air pollutants would be collected and vented to the atmosphere above the level of the park, and new land would be created for additional recreational activities. These factors represent major improvements over existing conditions.

Maintaining Traffic and Park Activities During Construction A proposed construction sequence was developed which will permit the maintenance of traffic during the entire construction period without interfering with park activities Traffic would be maintained on the existing Henry Hudson Parkway with no temporary traffic detours within the park, and no detours onto local streets

For about 60 percent of the length of the depressed route adjacent to the park, the limited space available will permit construction only of the southbound tunnel and some parts of the northbound section without encroaching into the existing highway Therefore it is proposed that these portions of the covered structure which are outboard of the existing roadway be constructed as a water-based operation, generally similar in concept to the procedure currently being used at the North River Water Pollution Control Project River barges will provide the space needed to receive and store shipped materials and to house the machinery which will be used for this phase of the construction

After the shell of the southbound tube has been completed, parkway traffic will be detoured onto the roof of the completed tube, thus permitting the remaining portions of the northbound section to be completed No construction would be permitted either from the park area or over the roof of the southbound tunnel while it is being used for maintaining traffic Because the highway would be constructed in usable segments each section of the corridor would have ongoing construction for only part of the total project implementation period When all tunnel work and interchange ramps are complete for each section, parkway traffic would be shifted to the covered section and the park land and promenade above constructed At the same time, the work of demolishing the existing parkway and restoring to park use the areas within the right-of way would be completed



Proposed Transit Systems

- Proposed Bus Route
- Buses In Mixed Traffic
- Proposed Bus Station
- Existing Bus Station
- Proposed Rail Route
- Proposed Rail Station
- Proposed Rail Transfer Station
- North

112th to 149th Streets

The section of the highway between 112th and 149th Streets has several different configurations along its length, depressed/covered, elevated/open, and elevated/covered. Each segment was designed to accommodate specific physical constraints opposite the highway at that point. For example, the 125th Street Valley, the Sanitation Department Marine Transfer Station, the North River Pollution Control Plant, and the proposed Riverbank State Park were all major design considerations. In addition, the existing Penn Central rail freight line and the proposed transitway facility had to be integrated with the highway geometry in a compatible manner. The selected alignment had to address these constraints, as well as provide improved access to the entire area, and increase the amount of available park land, thus enhancing redevelopment potential.

Starting from a depressed and covered alignment under Riverside Park, the highway would emerge from the tunnel at 124th Street, swing inboard and rise to become an elevated highway at 125th Street. From this point, the highway would span the 125th Street Valley area, allowing access to new recreational facilities constructed on 13 acres of offshore landfill. This new park land is compatible with several long range redevelopment proposals which envision 125th Street as a corridor to the waterfront. It would also permit the northward expansion of Riverside Park and the proposed continuous river edge promenade. Although no concrete development plans are currently underway in the valley, the eventual implementation of any of the existing proposals would result in detailed studies of appropriate highway alternatives for this section. Importantly, the highway viaduct would not interfere in any way with existing rail sidings, street level activities, operations of meat packing plants and warehouses between 125th and 134th Streets or service to the Marine Transfer Station at 136th Street which for the short term are expected to remain. Service for these operations would be improved substantially because of improvements to the streets beneath the elevated structure, and the more efficient ramp connections at 125th and 139th Streets designed to accommodate truck access to and from the highway.

The combined transitway-rail freight line which runs parallel to the highway in an existing tunnel under Riverside Park, also emerges as an elevated facility in this area. Starting from the tunnel exit at 124th Street, the two track rail line would rise slightly and cross the valley area on an elevated trestle adjacent to the proposed highway. If the proposed two lane express bus facility were implemented, it would exit from the east half of the tunnel, rise at a steeper gradient than the railroad, and then cross over the tracks to fit between the northbound and southbound expressway lanes at about 133rd Street. With a rail rapid transit system, this transition to the highway right-of-way would not be necessary.

Assuming a combined highway-busway facility from this point, the proposed elevated structure would continue north passing between the new Pollution Control Plant now under construction and Riverside Drive in an alignment adjacent to the two track railroad right-of-way. As presently planned the roof of the Pollution Plant will become a new state park connected to the adjacent community by two diagonal access ramps, one at 135th Street and the other at 145th Street. With the proposed new highway, both the railroad and the highway right-of-ways would be decked over between these access ramps forming a continuous deck between the park land west of Riverside Drive and the Pollution Plant. The 13 acres of additional park land will greatly improve pedestrian access to Riverbank State Park, and along with the proposed park extension to the north of the Pollution Plant, enhance the overall recreational opportunities in the area.

This section of the highway would have minimal impact on existing park use both during and after construction. Construction would be scheduled so that traffic can be maintained at all times without resorting to detours on local streets. Construction phasing would be intricate by necessity to assure such traffic maintenance even though the major part of the new work is an elevated section. In addition to the expansion of Riverside Park and Riverbank State Park, the design of this section of the highway improves access to the existing and planned activities in the 125th Street Valley area and permits the extension of a new West Side mass transit system to the George Washington Bridge and northern Manhattan.

149th Street to the George Washington Bridge
North of the Pollution Control Plant, the new elevated facility would consist of six highway lanes and two express bus lanes; if the transit facility is constructed for express buses. The most significant benefit of this section of the highway for the local Washington Heights community is the expansion of Fort Washington Park to the Pierhead Line, creating roughly 21 acres of new land. Construction of ramp connections to each level of the bridge and the Cross Bronx Expressway would also significantly improve access to these facilities for express buses, trucks and passenger cars.

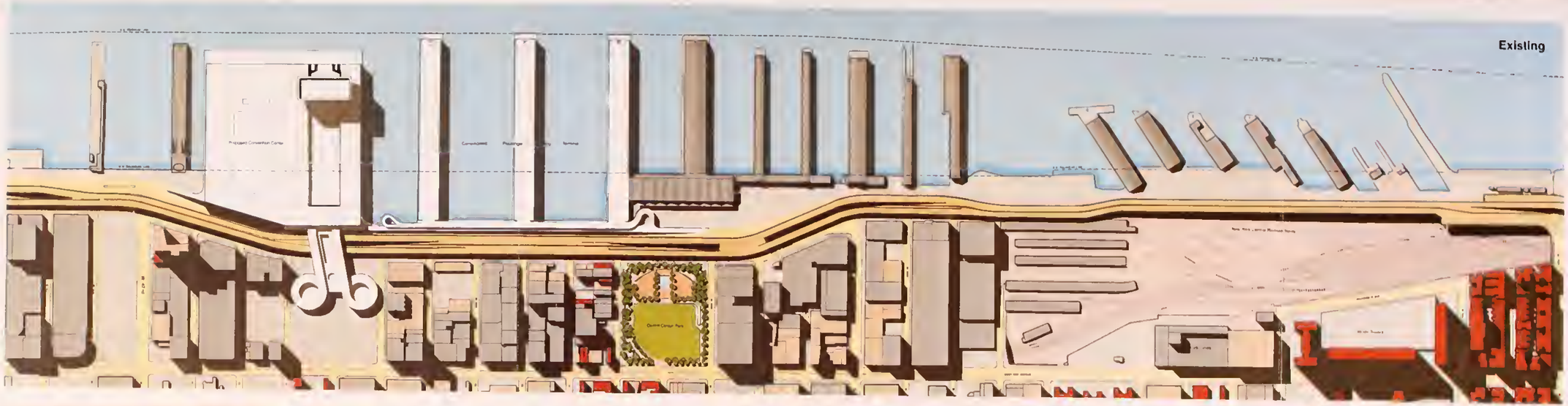
The elevated highway section at 149th Street would continue north and rise gradually to reduce ramp grades and connections with the Bridge and the Cross Bronx Expressway. At about 160th Street, the exclusive bus lanes would merge with expressway traffic as the Bridge access network begins. Also at 160th Street, the southbound highway lanes would continue above the Penn Central railroad right-of-way while the northbound lanes would utilize the existing parkway right-of-way. In the offshore area between 149th Street and the Bridge, Fort Washington Park would be extended to the Pierhead Line with a continuous pedestrian promenade provided along the water edge.

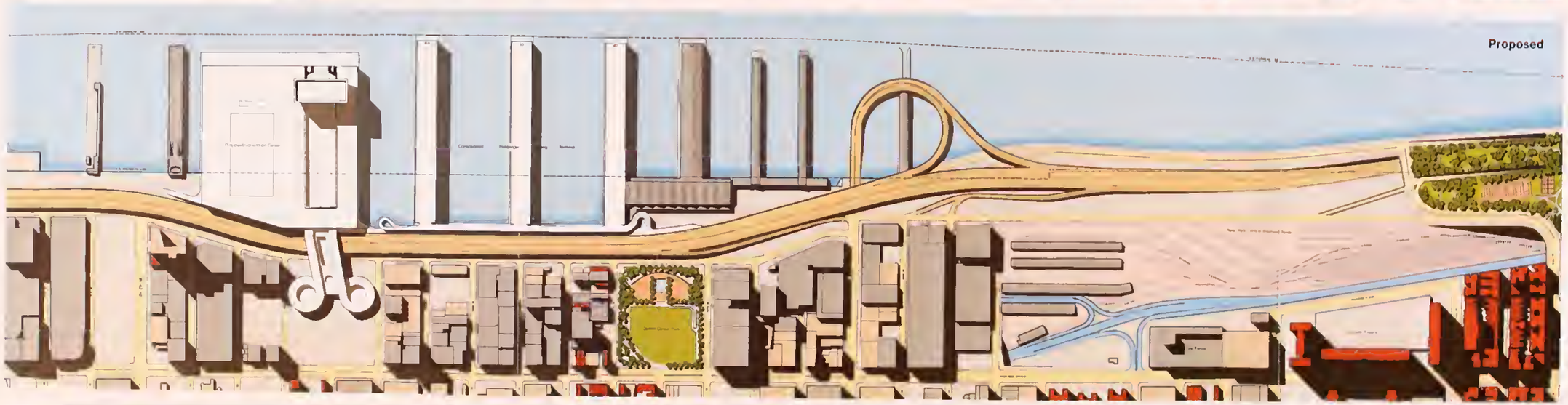
The new ramp system to the Bridge and the Cross Bronx Expressway was designed to reduce steep vertical gradients and increase the radius of curvature to accommodate the express buses and slower moving trucks which could not otherwise maneuver safely on the existing ramps. This also has the environmental effect of minimizing vehicle noise and exhaust emissions. A major portion of the new viaducts would be over the existing railroad right-of-way so as to have minimal impact on the active areas of Fort Washington Park. Also, new ramp structures have been planned so that their height and position will preserve views to the river wherever possible. Where existing ramps are no longer needed, the existing structures are removed and the land beneath restored to park use.

The estimate construction costs for the proposal were developed from the various drawings prepared for the study and from information collated for this project. Because the primary objective of the study was to focus on a waterfront solution in Riverside Park, structural investigations were pursued in greater detail in this area than for other sections.

Outside Riverside Park cost estimates were made principally on the basis of engineering experience and data compiled on recent comparable construction projects in the metropolitan area. Because of the limited scope of this investigation, certain components of the project were developed to a conceptual stage only. This includes such items as park construction, landfill work, subsurface treatments, ventilation, and traffic maintenance. Accordingly, the accuracy of the respective costs is commensurate with the degree of development to which these studies were carried. However, in consideration of the rather unique conditions which govern the design of the proposed covered highway along the east bank of the Hudson River, preliminary structural analyses were made in order to assess the feasibility of the design. The proposed structural section was developed in sufficient detail to extract costs based on itemized quantities.

Pricing of the various components was based upon independent analysis of prevailing material and labor costs, informal discussions with construction contractors, and unit costs developed for the project. South of 42nd Street it should be emphasized that the cost estimates are based on 1973 labor and material costs. The highway with all its components, including removing the Henry Hudson Parkway and replacing it with park land would cost $1,309 million. The additional park land and park facilities would cost approximately $175 million. ■





Midtown 40th Street to 72nd Street

- Highway
- Streets
- Transitway
- Parkland
- North

ersIde Park 72nd Street to 112th Street

- Highway
- Streets
- Transitway
- Bikeway
- Parkland

North

Existing

Proposed

verside Park 72nd Street to 112th Street

- Highway
- Streets
- Transitway
- Bikeway
- Parkland

North

Riverside Park 112th Street to 148th Street

- Highway
- Streets
- Transitway
- Bikeway
- Parkland

North

Fort Washington Park 148th Street to George Washington Bridge

- Highway
- Streets
- Transitway
- Bikeway
- Parkland
- North

Effects

Parks

Manhattan is a densely populated urban environment and therefore adequate open space and recreational facilities are crucial to the quality of life for its residents. Because Manhattan is an island it affords a unique opportunity to develop these recreational resources as part of its waterfront. This is particularly true in the Study Corridor, where the land use is predominantly residential and the Hudson River extends along the entire western edge. Accordingly, improvements in the amount and quality of open space, the numbers and types of recreational facilities, and the accessibility and use of the waterfront were considered essential elements in the development of the highway proposal from 42nd Street to the George Washington Bridge.

As the existing West Side Highway-Henry Hudson Parkway threads its way north from 42nd Street to the George Washington Bridge, it passes through or adjacent to three parks: DeWitt Clinton Park, Riverside Park, and Fort Washington Park. A fourth, Riverbank State Park, is planned atop the North River Water Pollution Control Plant at West 140th Street, which is currently under construction.

The numbers and types of recreational facilities in these and other parks within the Study Corridor, that area bounded by 42nd Street, Eighth Avenue, 178th Street and the Hudson River, are generally below the city-wide average. In a 1968 City Planning Commission Report,[1] criteria were established for the allocation of types and amounts of key recreational facilities for a given area. The methodology was based on a citywide analysis of age group use patterns for specific recreational facilities. In 1973 an inventory of existing facilities was made by the Department of Parks, Recreation and Cultural Affairs and the City Planning Commission.

[1] **Recreation Facilities in New York: A Method of Assigning Budgetary Priorities,** New York City Planning Commission, 1968

Using this methodology, inventory and 1970 Census data the Project Staff found deficiencies throughout the Study Corridor. While this was especially true of facilities for field sports such as baseball, football, and soccer, it was also true of nearly all other key facilities including handball, shuffleboard and paddle tennis courts and child play areas.

Because a detailed programmatic analysis of future recreational needs in the communities along the Study Corridor was not within the scope of this feasibility study, the proposed park plan augments the numbers of existing recreational facilities and establishes a system of interconnecting pedestrian and bicycle pathways separated by flexible landscaped areas into which specific facilities can be placed at a later date according to future needs. This expansion of recreational facilities is made possible by the addition of 178 acres of usable park land to the Hudson River waterfront.

The proposed park plan represents a specific design delineation which preserves existing park activities while knitting them into the fabric of a new and larger park. Before any design would be implemented, a detailed study of needed facilities would have to be undertaken that would incorporate the City's considerations as well as expressed needs of the affected communities. In the following pages the description of the open space plan will focus on the existing and proposed park land and for the various sections of the Study Corridor including DeWitt Clinton Park, Riverside Park, the proposed Riverbank State Park and Fort Washington Park.

DeWitt Clinton Park

In the area between 42nd Street and 72nd Street, the existing elevated highway passes immediately adjacent to DeWitt Clinton Park, a small local park of approximately six acres. In this area the proposed West Side Highway would be reconstructed in essentially the same location and at the same height as the existing highway. The park would not be physically impacted and the relationship which currently exists between the highway and the park would remain essentially unaltered.

Riverside Park

The existing Henry Hudson Parkway slices through Riverside Park at surface level, creating a strong physical barrier for pedestrians wishing to reach the water's edge. While there are discontinuous water edge promenades west of the facility between 72nd Street and 83rd Street and between 92nd Street and 106th Street, the waterfront can be reached by pedestrians at only five points in the park, 72nd Street, 79th Street, 83rd Street, 93rd Street, and 100th Street. Since the completion of the Henry Hudson Parkway in the late 1930's, the park configuration and facilities have remained essentially unchanged. Over the years the need for additional recreational facilities in this area has become apparent.

Throughout Riverside Park from 72nd Street to 125th Street, the proposed highway has been designed as a covered section constructed in the Hudson River west of the present shoreline. Depressed below the existing water level, the highway would be decked and covered with earth. The existing park boundary would thereby be extended westward over the covered highway to include 63 acres of new park land which would be at approximately the same elevation as the park land that currently exists along the water's edge.

The Department of Parks, Recreation and Cultural Affairs lists Riverside Park to include 266 acres. This figure includes roadways, ramps, and open water east of the Pierhead Line. By simple map measurement techniques, the existing park contains roughly 190 acres of usable park space for which there is pedestrian access. In addition to the land which would be created above the new highway, 38 acres of land would be reclaimed as park land by the removal of the existing Henry Hudson Parkway. In total the proposal would enlarge the usable park area by approximately 53 percent, or a total of 101 acres. It would in turn represent a sizeable increase in the space available for additional recreational facilities.

Because the new highway would be below the pedestrian level, decked over and covered with earth, and the existing Henry Hudson Parkway would be removed, the waterfront would become directly accessible to pedestrians at any point along the entire length of Riverside Park. This represents a vast improvement over the limited access to the water which currently exists. That portion of the deck closest to the water's edge would become a continuous promenade. This new promenade, which would be about three miles in in length, would become an important element in Riverside Park. The plan for the promenade includes a paved area strongly accented by a double row of deciduous trees. Opportunities to sit and rest would be available throughout its length. At suitable intervals, nodes of activity would be created which would bring life to the promenade and divert the casual stroller. Because of the proximity of the promenade to the water the Hudson River would be directly accessible from any portion of the promenade edge.

The promenade to be extended from 70th Street to 135th Street

Several additional features which currently exist along the waterfront in the Riverside Park area not only would be retained but also enhanced. West 79th Street, which now forms an axis between the Museum of Natural History on Central Park West and the 79th Street Marina on the Hudson, has been recognized as a major pedestrian route to the waterfront. The existing highway ramps make this connection somewhat tortured and circuitous, but the design and location of the marina presents a unique opportunity. Because the 79th Street interchange is removed in the proposal, the existing highway ramps would be replaced by park land, creating more direct pedestrian access. The 79th Street rotunda with its lower level fountain and colonnade would be preserved. The ramps which currently serve the marina's parking facility would also be maintained. Immediately west of the rotunda, the boat basin would be rebuilt outside the new water edge promenade, maintaining the same activities at the ends of the 79th Street axis which currently exist, enhancing the quality of the surrounding park land, and improving access to the water.

The proposed 96th Street interchange, a local exit and entrance for automobiles only, will simplify the complex roadway structure which currently exists to service the Henry Hudson Parkway. The proposed interchange configuration permits the land encompassed by the ramps to become usable open space providing a large naturally enclosed area for the expansion and reconstruction of the tennis courts presently located there. Because of the new ramp design and because the highway itself remains covered and depressed within this area, the amounts of usable space will be increased and the environmental quality of the area will be improved. Additionally, the colonnaded structure of the ramp portion of the interchange will create a gateway enhancing both visual and pedestrian access to the water's edge.

The proposed highway makes the transition from a covered section to an elevated section in the 124th Street area. It proceeds northward from this point as an elevated section following the same alignment as the existing Henry Hudson Parkway. The elevated section has been designed so that it does not impact the Meat Market located in the 125th Street Valley area east of the present highway. Outboard of the present shoreline a 13 acre new community park designed as an extension of Riverside Park is proposed. The water-edge promenade would continue north to 135th Street where it would terminate to allow for the continued operation of the existing Marine Transfer Station.

Numerous agencies over the years have looked at this area for possible redevelopment. However, only one residential project located at 134th Street has progressed to the construction stage. The proposed park could become a focal point in this residential growth. If further redevelopment were to occur in the 125th Street area, additional highway options would have to be developed to determine what solutions would best benefit these changes.

Existing

Proposed

Existing

Proposed

Proposed Section through North River Pollution Control Plant

Riverbank State Park

Immediately north of 125th Street no park land currently exists along the waterfront, although the new 28 acre Riverbank State Park atop the North River Water Pollution Control Plant will be located between 137th and 144th Streets. The new park is presently planned to contain a variety of playfields and courts, a swimming pool, a gymnasium and numerous other indoor facilities. However, a wide trench will exist between Riverside Drive and the park in which the 135th Street rail yards and the highway are now located. Because the new park and Riverside Drive will be at approximately the same elevation, roughly 50 feet above the rail yards, current plans call for connections by diagonal service roads at 135th and 145th Streets for cars and buses as well as pedestrians. Additional pedestrian bridges are proposed to connect with the diagonal service roads at 136th, 137th, 143rd and 144th Streets.

The proposed highway would follow the same alignment as the present Henry Hudson Parkway. A 13 acre landscaped deck connecting Riverbank State Park with Riverside Drive would be provided over the proposed highway and the existing railroad yards. The result would be the physical and visual integration of Riverbank Park with Riverside Drive and the upland neighborhood and improved pleasant pedestrian access separated from vehicular traffic.

Fort Washington Park

North of the North River Water Pollution Control Plant, an extension has been proposed as part of Riverbank Park which would, through a series of steps and terraces, tie the new park to Fort Washington Park. The open space which is proposed with the new highway would complement this extension proposal and create a sheltered inlet between 147th Street and 152nd Street. Immediately north of the inlet would be an inland pond suitable for small boats or waterside picnics.

A water edge promenade would be provided beginning at Riverbank State Park, wrapping around the sheltered inlet and continuing north to the George Washington Bridge, terminating at the *Little Red Lighthouse*.

In order to connect to the George Washington Bridge at an elevation approximately 200 feet above ground level, the proposed highway would begin to rise in elevation in the area north of Riverbank, passing above Fort Washington Park in the same alignment as the existing Henry Hudson Parkway and rail line. This is in contrast to the existing highway which, with exception of an area between 153rd and 160th Streets, is at park level. Both the existing parkway and the rail line act as barriers to the waterfront in this area.

Fort Washington Park would be expanded to the Pierhead Line to include new recreational facilities. Access to the expanded waterfront park would be essentially the same as that which exists north of Riverbank Park to 160th Street, with pedestrian bridges over the rail line at 148th, 151st, 155th and 158th Streets. However, the new highway elevation would make these connections a more pleasant experience.

New pedestrian access points would be provided beneath the proposed highway and above the existing rail line at roughly 162nd, 164th and 168th Streets. A parking area would be provided opposite 169th Street which would be accessible from Riverside Drive. The existing pedestrian bridge over the rail line at approximately 172nd Street would also be maintained.

The existing usable park space in the area between 125th Street and the George Washington Bridge amounts to 95 acres. The new park land proposed with the new highway would increase this amount by 81 percent, or roughly 77 acres. As in the area to the south, this additional area could provide the community with a renewed opportunity to expand its recreational facilities and make the waterfront more easily accessible to local residents.

Existing

Proposed

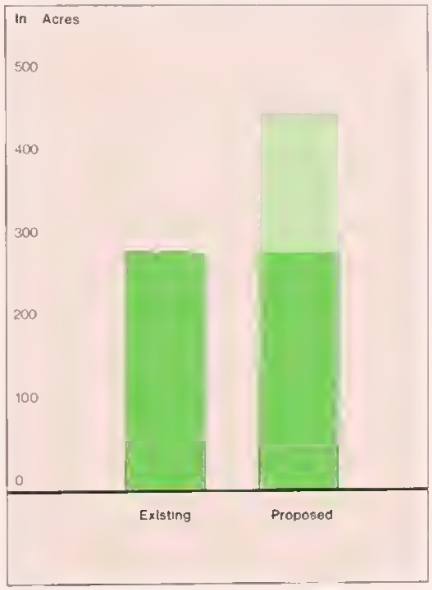
Proposed Bicycle Path

Bicycle Path

North

A bikeway proposal has also been incorporated into the design of the expanded park. Beginning at roughly 76th Street, the bikeway would weave its way between park activities, providing the rider with a varied environment and glimpses of the river and the New Jersey shore. The bikeway is proposed as a continuous route from 76th Street to the George Washington Bridge, a distance of about five and one half miles.

In total, the new highway proposal would add 178 acres of additional park land to the 286 usable park acres which currently exist along the Hudson River waterfront. This represents an expansion in usable park size of approximately 60 percent.



Comparable Park Acreages

As a result of the offshore construction and other special construction techniques planned for the highway, all activities within Riverside Park would be able to continue uninterrupted throughout the construction period, with the exception of the existing water edge promenades between 72nd and 83rd Streets and 92nd and 102nd Streets, the Marina at 79th Street, and the tennis courts at 96th Street. With proper construction staging in these few areas, the unavoidable disturbance would be reduced to a minimum.

In summary the proposal would increase the quantity and improve the quality of all the park lands along the Hudson River waterfront. It would give residents the opportunity to take advantage of their proximity to the Hudson River by providing for nearly continuous waterfront access from 72nd Street to the George Washington Bridge. Additionally, the barrier of the existing on grade Henry Hudson Parkway would be removed. The result would be a continuous recreational area along the Hudson River from 72nd Street to the George Washington Bridge the scale of which would be matched only by the River itself.

Traffic and Transit

The importance of a highway facility on the Upper West Side now and in the foreseeable future has been clearly demonstrated in recent months by the closing of the Henry Hudson Parkway from 72nd to 79th Streets and the restriction of traffic flow in the 96th Street interchange area

The traffic consequences of this condition have been felt throughout all of Upper Manhattan, including the East Side, although the greatest impact has been on West Side thoroughfares This increase in traffic and resulting congestion has occurred during a period of months when for the region as a whole there were overall reductions in the use of autos, first because of the gasoline shortage, and later because of the increased price of fuel

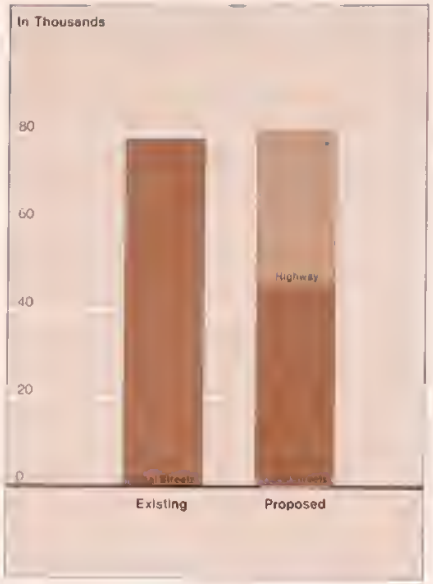
The eventual repair and reopening of the Parkway, strongly demanded by Upper West Sido community and citizen groups, will have the effect of re-establishing a situation similar to what existed before the highway closed In the past the Upper West Side found even this less than desirable or unacceptable as specified earlier in this report.

As shown in this proposal, two potential conditions were forecast for more than 20 years into the future, specifically to 1995 Either the Henry Hudson Parkway and the Miller Highway below 72nd Street will be repaired and maintained in operating condition as they have been in the past, or the highway would be rebuilt with a transitway component This would be a rail transit facility or a transitway reserved exclusively for express buses [7]

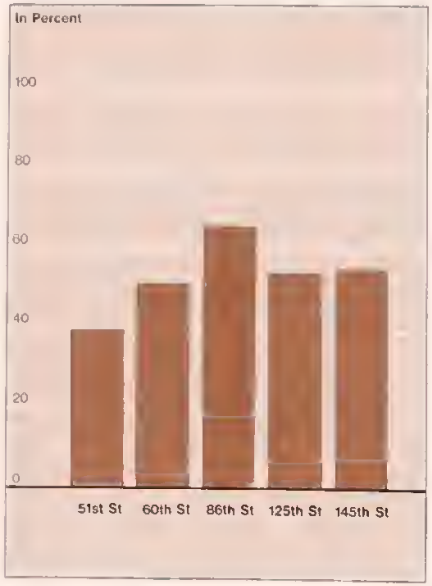
The City is committed to reopening the Parkway and maintaining it in operating condition. However, under these conditions it can be assumed that no transit facilities will be built in the region in addition to those now planned, and by 1995 it is expected there will be an increase in traffic on Upper West Side thoroughfares This will result from increases in auto use from other boroughs and suburban counties as well as Upper West Side residents. These residents though fewer in number than at present will be owning and using more autos The increased traffic, estimated at 6.6 percent as measured by vehicle miles travelled, will reflect a small change in mix with increases in autos and trucks and decreases in the use of taxis

Importantly, Upper West Side residents using transit will decline by approximately 12 to 14 percent although this will be offset by a greater number of transit patrons travelling through the Upper West Side from other boroughs and the Metropolitan Area counties The reduction in subway use by Upper Manhattan residents is a direct reflection of the lower population estimate for the future

[7] West Side Corridor Transit Study, April 12 1974



Miles Travelled by Trucks Daily in the Study Area in 1995



Percentage of Trucks Diverted Daily from North-South Streets at Each Screenline in the Study Area in 1995 with the Proposed Highway

If the Parkway is not reconstructed and there are no additions to the transit system beyond those now planned, approximately 43 percent of all vehicle miles travelled will be on the arterial street system in 1995, the same percentage as at present Despite the forecasted decrease in population in Upper Manhattan, 52 5 percent of all the vehicle miles travelled in Manhattan on an average daily basis will be on Upper Manhattan streets and highways, less than one percent lower than at present.

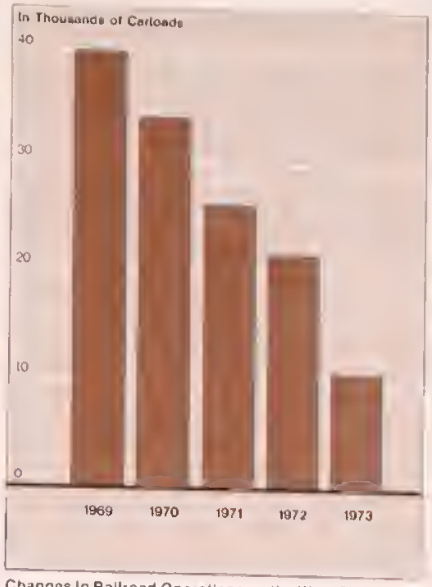
Heavy truck traffic is estimated to increase approximately six percent in Upper Manhattan All of this increase will be on local streets because trucks are banned from both the Henry Hudson Parkway and the East River Drive. West of Central Park, most of the increase will be on Columbus, Amsterdam, Broadway and West End Avenue

If the Henry Hudson Parkway is not rebuilt, nevertheless it will experience moderate increases in traffic over the next 20 years although a very small portion of this increase will be during the peak traffic period because the Parkway presently is congested and operating almost at capacity during these hours Therefore, during the rush hours the increased traffic will be absorbed primarily by the adjoining north-south streets If the highway were rebuilt, measured during both peak periods, there would be a modest reduction in traffic on Upper West Side Streets

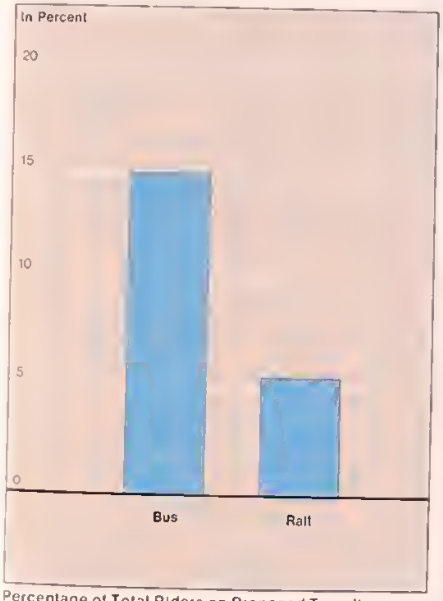
The reconstruction of the Parkway as a six-lane highway as contained in this proposal will have its most dramatic effect in shifting truck traffic off the Upper West Side thoroughfares and onto the new facility Over an average 24-hour period, some 6800 to 7200 heavy trucks would use a reconstructed highway between Midtown and the George Washington Bridge instead of the Upper West Side thoroughfares There would be a reduction from 79,000 to 46,000 vehicle miles travelled, a 42 percent reduction

The exact number of trucks diverted off Upper West Side streets would vary from one location to another The percentages range from a reduction of about 40 percent in the West Midtown area to more than 60 percent in the vicinity of 86th Street As one might expect the diversions primarily would be from Columbus, Amsterdam, Broadway and West End Avenue

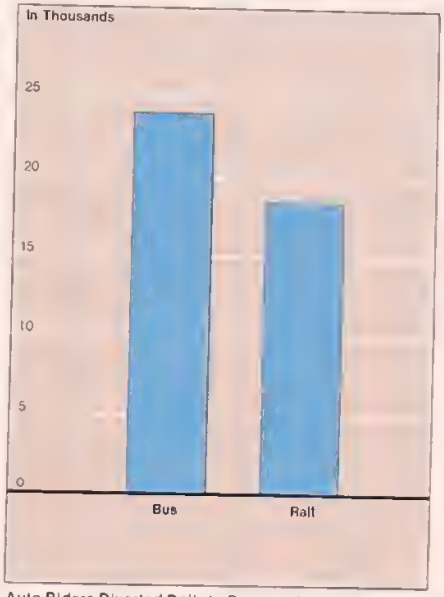
There also would be a modest reduction in total traffic if the highway is rebuilt with its transit component because both the rail transit and express bus system would divert some drivers and passengers from autos



Changes in Railroad Operations on the West Side



Percentage of Total Riders on Proposed Transit System Diverted Daily from Automobiles



Auto Riders Diverted Daily to Proposed Transit Systems

Both the percentage and actual number of auto drivers and riders diverted would depend on whether the transit service is an extension of the City subway system or whether it is an express bus system

As a West Side rail transit line, approximately 4.9 percent of the users, or about 16,200 persons, would otherwise have commuted to the Central Business District by auto.

As a West Side express bus transit line, approximately 15 percent of the express bus riders, or about 24,500 persons, would be diverted from autos

Important to both transit alternatives is the availability of Penn-Central Railroad right of way from Upper Manhattan, through the tunnel under Riverside Park and the 60th, 37th and 33rd Street Yards. A drastic decline in rail freight use in recent years opens up the opportunity for transit use of the largely under-utilized rail property. An indication of the reduction in the importance of rail freight traffic on the West Side is that annual carloadings have decreased from about 40,000 in 1969 to about 11,000 in 1973. Studies made by the West Side Highway Project, including conversations with Penn-Central officials indicate there is little possibility that this condition will be reversed. In fact, the uncertain status of the bankrupt railroad and its potential consolidation into a new system poses the problem of whether West Side rail freight service will be continued into the future

The alternative plans discussed here and presented in the West Side Corridor Transit Study were developed on the assumption that rail freight either would or could continue, and engineering plans and designs were developed in order to preserve the option of freight operations

The two transit alternatives were developed to provide two distinctly different types of transit service The rail system was designed to provide high-speed service from the Bronx and Upper Manhattan to the West Midtown and Downtown areas. An indication of the high quality and speed of service is that it would cut in half the riding time between 240th Street and the World Trade Center

The rail transit alternative, on the Van Cordlandt Park branch, would provide stations at 225th Street, University Heights, Morris Heights and the George Washington Bridge before joining the Grand Concourse branch, which would provide a station at 146th Street and St Nicholas Avenue After the two branches are joined, stations on the West Side would be located at 96th, 60th, 45th, 34th, 23rd, 14th and Christopher Streets and the World Trade Center The rail alternative also would extend and provide connections with the Flushing Line which now ends at 42nd Street and Seventh Avenue, and the Canarsie Line, which now ends at 14th Street and Eighth Avenue

Projected to 1995, the rail transit alternative would provide 372,000 person trips The number of riders using this line would vary over its entire length, but the section which would experience the peak loading would be between 60th and 96th Streets where an estimated 251,000 persons would ride during an average 24-hour day.

The primary market for the rail transit line would be the Bronx Bergen and Westchester Counties and Upper Manhattan, in that order The transit line would attract patrons who would transfer from commuter buses at the George Washington Bridge and from the Penn-Central commuter lines at the Grand Concourse.

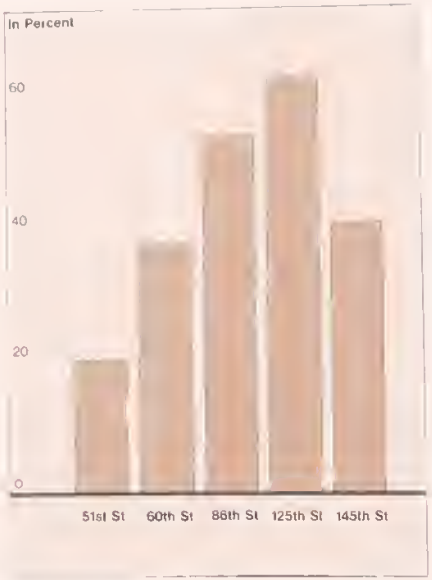
The express bus transit alternative would make use of a two-lane roadway exclusively for the use of buses Throughout most of its length, it would occupy the same space as the rail transit alternative in one of the West Side Highway Project alternatives in the south and the Penn-Central right of way through midtown and extending through the Upper West Side

Express buses would enter and leave the exclusive bus lanes at the George Washington Bridge and Cross-Bronx Expressway, 125th, 60th, 41st, 34th, 23rd and 14th Street and at the World Trade Center. Buses from Brooklyn and Staten Island also could enter and leave the exclusive bus lanes at the Brooklyn-Battery Tunnel.

The primary objective of the express bus transit alternative is to provide high-speed through service to the sections of outlying boroughs and suburban areas not well served by transit. The service features as nearly as possible door-to-door service with passengers collected and distributed between their residential areas and the Central Business District with no transfer, or at most one transfer. A significant feature of this service would propose designation of one lane during peak periods on crosstown streets for the use of express buses These streets would be 57th, 50th, 42nd, 34th and 14th Streets

The primary market areas for this transit alternative include the Bronx, Westchester, Bergen and Rockland counties, and Brooklyn and Staten Island.

Projected to 1995, the exclusive busway would provide service for approximately 164,000 customers on an average 24-hour day The peak load on the busway would be in the section between 60th and 125th Streets with an estimated 118,000 riders



Percent of Southbound Automobiles Diverted in the Morning Peak Hour from North-South Streets at Each Screenline in the Study Area in 1995 with the Proposed Highway

Either transit alternative would primarily service the present and future growth and development of the West Side

Either of the transit alternatives can be constructed as a part of three of the five alternative plans presented by the West Side Highway Project between the Battery and Midtown Construction of one of the transit alternatives as a part of building or rebuilding the West Side Highway south of Midtown, particularly in the area from the Battery to 23rd Street will present an opportunity for substantial construction economies in addition to the use of Federal highway funds for many construction elements The rail transit alternatives can be constructed independently of rebuilding the Henry Hudson Parkway although there also would be construction efficiencies if the two projects were undertaken together The express bus transit alternative would be accomplished most efficiently if built as a part of parkway reconstruction, although it also could be accomplished without full reconstruction of the Henry Hudson Parkway

The rail transit alternative from the Battery to the Bronx with the branches to Van Cordlandt Park and the Grand Concourse is estimated to cost $1.132 billion This does not include transit cars

The exclusive busway from the Battery to the George Washington Bridge would cost an estimated $442 to $494 million depending on the highway alternative with which it is connected

An additional feature of the combined highway-transit planning and design work is that the transit alternatives were planned and designed in such a way that the transitway could be constructed initially as an exclusive busway and later converted to a rail transit line The estimated cost of converting the busway to rail transit from the Battery to 136th Street would be $264 million and an additional $654 to $700 million to extend the rail line and its branches to Van Cordlandt Park and the Grand Concourse.

Noise

The primary purpose of the noise study was to predict traffic noise levels that can be expected to occur under two conditions: first, with the existing highway configuration and projected 1995 traffic, and, second, with a reconstructed highway and projected 1995 traffic. The methodology used was that developed by the Transportation Systems Center of the United States Department of Transportation, as modified for use in the West Side Highway Project noise study for the area south of 42nd Street. The method was further developed and validated for this feasibility study by on-site measurements at 39 locations in the West Side area between 42nd Street and the George Washington Bridge.

The Unit of Noise Measurement

Throughout this section, noise is expressed in units of dBA L_{10}. This unit reflects the three characteristics of environmental noise which are most important in determining man's subjective response.

dB. Airborne sound is a very small, rapid fluctuation of air pressure above and below atmospheric pressure. Sound levels are usually measured and expressed in decibels (dB), with zero dB corresponding roughly to the threshold of sensitivity of hearing.

A Level. The "A" level is a frequency weighting which reflects the fact that human hearing is less sensitive at low frequencies and extreme high frequencies than in the frequency midrange. The weighting curve most often used is called "A weighting," and the level so measured is called the "A-weighted sound level" or simply "A-level." The letter "A" in the unit indicates that this frequency weighting was used; in practice, the A-level of a sound is measured using a sound level meter with a filter corresponding to the A-weighting curve.

L_{10}. Although the A-level may adequately describe noise at any instant in time, in fact the noise level in a community varies continuously. Most noise includes a conglomeration of distant noise sources which creates a relatively steady background noise in which no particular source is identifiable. These distant sources may include traffic, sirens, children playing, aircraft, and industrial or commercial activities. These noise sources are relatively constant from moment-to-moment, but vary slowly from hour-to-hour as human activity follows its daily cycle. Superimposed on this slowly-varying background is a succession of identifiable noisy events of brief duration. These may include nearby activities such as a car passing by or aircraft flyovers, which cause the noise level to vary from instant to instant. It has become standard practice to account for this time-varying character of environmental sound statistically. The statistical descriptor used in this study is the A-Level that is exceeded 10 percent of the time, or L_{10}.

Although absolute sound levels are important in determining the impact of noise on human activities, another important parameter in determining a person's subjective reaction to a new noise is the existing noise environment — the so-called "ambient" noise. In general, the more a new noise exceeds the previously existing ambient, the less acceptable the new noise will be judged by the hearers.

The following relationships will be helpful in understanding the effects of increases in noise levels:

- Except in carefully controlled laboratory experiments, an increase of only one dB in A-level cannot be perceived.
- Outside of the laboratory, a three dB increase in A-level is considered a just-noticeable difference.
- A change in A-level of at least five dB is required before any significant change in the noise level in a community would be expected.
- A ten dB increase in A-level is subjectively heard as approximately a doubling in loudness, independent of the existing noise level.

Noise Standards

The noise study reported here utilized the same methodology as the West Side Highway Project between the Battery and Midtown. The measurement and analysis methodology, as well as the noise standards used for reference in this section, are as prescribed by the Federal Highway Administration (FHWA). The FHWA standards establish the appropriate Design Noise Levels for various types of land uses, and are applicable to traffic noise, which is calculated for the loudest traffic condition during the design year of the project under study. The FHWA standards are for national application and do not distinguish between urban and rural areas.

The FHWA standards which are applicable to land uses in the West Side Highway Extension study area are shown in the table below.

FHWA Standards

Land Use Category	Design Noise Level (L_{10})	West Side Land Uses
B	70 dBA (exterior)	Riverside Park, DeWitt Clinton Park, Lincoln Center Plaza, other park areas, outdoor areas associated with residential buildings
E	55 dBA (interior)	Interior of residences, schools, churches, hospitals

The FHWA guidelines provide for a noise reduction factor of 10 dB to be applied to exterior noise levels to estimate the shielding effect of a building. In the absence of actual measurement of this shielding effect, it is assumed that a building with windows which can be operated, and in which the windows are open, would have a noise level 10 dB below that predicted at the exterior building face. This is considered a conservative reduction for residential buildings like those on the West Side. The FHWA interior standard for residences and institutional buildings is 55 dBA L_{10}. Therefore, the maximum exterior level at the building face which would allow the standard to be met would be 10 dB higher, or 65 dBA L_{10}.

The Noise Measurement Program

During 1973, noise measurements were made at 39 sites within the West Side Highway extension study area. This noise survey program documented existing noise levels in the West Side study area and then used these values and 1972 traffic counts to calibrate the noise prediction model for 1995 noise levels.

The 39 measurement sites represent 30 different locations because, at three locations within Riverside Park measurements were made at different distances from Riverside Drive and the Henry Hudson Parkway to aid in determining the effects of distance from the noise source and of noise shielding provided by the terrain of the park. Thirty-two of the measurement sites were selected by the study staff, and the remaining seven sites were selected by Community Boards Seven, Nine, and Twelve.

The measurement sites fall into five general categories:

1. Typical residential areas near Riverside Park.
2. Outdoor recreational areas: Riverside Park and DeWitt Clinton Park, and the Lincoln Center Plaza.
3. Non-residential noise-sensitive sites such as hospitals, churches and schools.
4. Residential areas along interior West Side avenues and streets such as Broadway, Columbus and Amsterdam Avenues, 125th Street, 179th Street and Undercliff Avenue.
5. Sites remote from major traffic streets, which were selected to allow establishment of a reasonable daytime "base level" of noise in Manhattan.

At all of the residential sites along Riverside Drive and at Lincoln Towers, the measured exterior noise levels were relatively high, ranging from a low of 69 dBA L_{10} at 106th Street, to a high of 77 dBA at 170th Street. If the FHWA noise reduction factor of 10 dB were applied to these levels, the noise levels inside the buildings would be 59 to 67 dBA L_{10}, or from 4 to 12 dB over the FHWA interior design noise level. In addition, exterior recreational areas associated with these buildings such as gardens and balconies, would be above the 70 dBA L_{10} design noise level for all measurement sites except 106th Street.

The noise levels measured within Riverside Park generally were higher at sites which were close to the existing Parkway, and above the level of the existing road. Five sites were measured in the vicinity of 77th Street across Riverside Park, four at 103rd Street, and three at 148th Street. Noise levels at 77th Street ranged from 69 dBA L_{10} at two sites above the Parkway, to 61 dBA L_{10} at the river edge promenade. At 103rd Street, a level of 81 dBA L_{10} was measured at a distance of 34 feet from the Parkway; the levels at the 103rd Street sites further from the road were 63 and 67 dBA L_{10} — more typical of the park levels measured. The 148th Street sites had levels from 67 to 63 dBA L_{10}. Of the remaining park sites, those at 89th Street along the river edge promenade and at the 120th Street tennis courts were fairly high — 77 and 75 dBA L_{10} respectively. The noise measurement at DeWitt Clinton Park was 77 dBA L_{10}, and that at Lincoln Center was 71 dBA.

The only site which falls into the third category, sensitive non-residential uses, is the Columbia Presbyterian Hospital at 165th Street and Riverside Drive. The noise level measured at the site was 75 dBA L_{10}. Like residential buildings, the interior FHWA standard for hospitals is 55 dBA L_{10}. Even with the 10 dB allowance for building shielding, the hospital is presently 10 dB over the standard.

Noise levels at sites along the interior avenues varied from lows of 75 dBA L_{10}, measured at several sites, to a high of 83 dBA L_{10} at Amsterdam Avenue between 85th and 86th Streets. Because all sites were adjacent to residential buildings, the levels at those sensitive land uses can be assumed also to be high — almost certainly above the FHWA standards. The highest level measured on the West Side streets was at 179th Street, overlooking the Trans Manhattan Expressway. The level, measured in the early afternoon, was 89 dBA L_{10}, and was the highest reading measured at any of the 39 sites on the West Side.

Two sites were measured in Central Park at some distance from an identifiable traffic noise source to establish a reasonable base level for daytime noise in Manhattan. The first site was at the Sheep Meadow where the measurement was 59 dBA L_{10}. The second site was near the 96th Street tennis courts; the measured noise level at that site was 57 dBA L_{10}. Both measurements were made in the late afternoon. Given these levels, it is assumed that 55 dBA L_{10} is the minimum exterior level which could be found at any location in the study area during the daytime, and more specifically, that the minimum achievable noise level in Riverside Park is 55 dBA.

Noise Prediction Method

The calculation method of the Transportation Systems Center of the United States Department of Transportation was used to predict traffic noise levels for the existing highway with projected 1995 traffic, and for the proposed highway and its projected 1995 traffic. This method is not applicable for stop-and-go arterial street traffic and, therefore, the method was amended through measurements made as part of the West Side Highway Project. Specifically, for the study south of 42nd Street, noise emissions of several hundred trucks and buses were measured on New York City streets to allow extension of the model to very low speeds. Medium trucks were measured separately because of the large number of these vehicles within the City. In addition, the effects of cobblestone pavements and stop-and-go traffic were measured.

The resulting model employs the Transportation Systems Center Noise Nomograph, extended by these measurements, to determine the close-by noise levels in units of dBA L_{10}. The levels of noise depend upon the traffic volume, speed, and mix between heavy trucks, medium trucks, buses and automobiles, as well as distance from the traffic, the existence of walls behind the receiver and pavement roughness.

The calculations begin with the morning and afternoon peak-hour volumes for automobiles, trucks and buses along with the corresponding speeds predicted by the traffic assignment process for the existing highway, for the proposed highway, and for the street network. These volumes and speeds vary from block to block along arterial streets, and from interchange to interchange along the existing and proposed highways. The truck volumes are divided between heavy and medium trucks. If the peak hours are congested, automobile noise will be artificially low, because slow speeds mean quieter automobiles (the same is not true for trucks, however). For such cases, the loudest possible automobile condition is substituted for the peak hour automobile condition. This loudest condition would probably occur just before and just after the peak hours. Sometimes this substitution is necessary for just one of the two peak periods, sometimes for both. Finally, the morning peak noise level and the afternoon peak noise level are both computed, and the louder condition is chosen. Note that when the traffic is congested at the peak hour, the louder automobile condition is substituted, and the loudest-auto and loudest-truck conditions are actually combined, even though they occur at different times of the day.

The noise model was further modified to accommodate measurements made in Riverside Park. In the park near 77th Street, 103rd Street and 148th Street, measurements were made at varying distances from the Parkway to determine the shielding effect of the park terrain. This calculated barrier effect was used as input to the model in predicting noise at park locations. Detailed information on noise measurement and calibration of the model for all sites are contained in the appendix to this report.

In addition to predicting traffic noise for the reconstructed highway, it was also necessary to assess the noise levels near any ventilation buildings and for the busway transit option. The assumptions used in calculating exhaust fan noise, predicted noise from this source and possible abatement measures are discussed in the appendix.

Projected Noise in 1995

In the assessment of predicted noise for 1995, the traffic noise associated with the proposed highway is compared with that predicted for the existing highway. The comparison shows two general patterns. First, where the proposed new highway is covered and ventilated, its traffic noise levels are lower than those of the existing highway configuration for areas within Riverside Park and along Riverside Drive. Where the proposed highway is open — that is, in the area from 123rd Street to the George Washington Bridge — traffic noise produced by trucks, buses and autos on the mainline highway are higher than those on the surface parkway which carries only automobiles. The second observation is that traffic noise levels on the interior streets and avenues are lower with the proposed highway than with the existing highway. This is true for all but one of the sites for which calculations were possible. The lower noise levels on the interior avenues for the proposed highway are due to the diversion of trucks from those streets to the new highway.

1995 Noise Levels — dBA L_{10}

Location	Proposed Highway	Existing Highway
Lincoln Towers, between 69th & 70th Streets	69	62
Schwab House, Riverside Drive between 73rd & 74th Streets	61	65
Riverside Drive, between 86th & 87th Streets	60	67
Riverside Drive between 106th & 107th Streets	62	66
Riverside Drive between 114th & 115th Streets	66	69
Riverside Drive between 134th & 135th Streets	75	69
River Terrace Apartments, 158th Street	73	69
Riverside Drive, Columbia Presbyterian Residences, 170th Street	73	66

Typical Residential Areas

The eight locations considered in this category are residential areas along Riverside Drive, and the Lincoln Towers apartments between 69th and 70th Streets. At four sites in the area from 72nd Street to 115th Street, 1995 traffic noise associated with the proposed highway would be lower than that of the existing highway. Below 72nd Street and above 123rd Street, noise levels predicted for the existing highway in 1995 would be lower. These differences are a result of the change in the proposed highway's configuration at 123rd Street from enclosed to open.

The table above shows the predicted 1995 noise levels for these eight residential locations. The levels indicated are those predicted to occur at the west face of the buildings at the location, and are at ground level. Noise levels above ground level, such as those at the upper stories of buildings, would be somewhat higher than those indicated for both the existing and the proposed highways.

The 1995 noise levels for the existing highway are almost identical with those calculated for 1973 at these locations. Noise from exhaust fans for the proposed highway would be lower than traffic noise at all of these locations.

Outdoor Recreational Areas

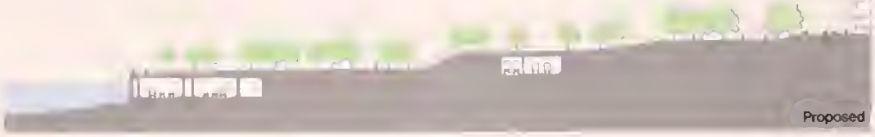
For each of the six locations in Riverside Park, cross sections showing the predicted noise for the proposed highway and for the existing highway have been prepared. These cross sections extend from Riverside Drive on the east to the edge of the park on the west. Those for the proposed highway show the highway and ramps, where applicable, the transitway location, and Riverside Drive. Those for the existing highway show the highway and its entrance and exit ramps, the Penn Central right-of-way, and Riverside Drive.

The brown tones in the cross-sections on the following pages show the predicted noise levels in 1995, the lighter the tone, the lower the predicted noise level. The lightest brown tone on the drawings indicates noise levels between 65 and 69 dBA L_{10}. As can be seen from these illustrations, many areas are not toned and are therefore predicted to have noise levels below 65 dBA L_{10}.

78th Street

Existing Highway Noise from the existing highway will be between 70 and 74 dBA L_{10} in the immediate vicinity of the highway and ramps. Levels from 65 to 70 dBA L_{10} will extend eastward from the highway to Riverside Drive, masking traffic noise from the Drive. These levels will also extend westward toward the River. Because the park areas to the west of the Parkway are lower than the road, they will have lower noise levels, approximately 62 dBA L_{10} is predicted for the river edge promenade at this location.

Proposed Highway As the illustration shows, noise levels from traffic are not predicted to reach 65 dBA L_{10} at this location. This includes noise from traffic on the proposed highway which is covered at that point, and traffic noise from Riverside Drive. In the immediate vicinity of Riverside Drive, noise levels are predicted to be from 60 to 64 dBA L_{10}. These levels do not extend as far as the buildings facing on the Drive. Exhaust fan noise from the ventilation building near 70th Street is predicted to be approximately 53 dBA L_{10} at the 78th Street location, and, therefore, would not be perceivable above the normal daytime noise.



89th Street

Existing Highway Noise levels above 65 dBA L_{10} extend for some distance from the existing highway. Levels from 65 to 69 dBA L_{10} will occur from the western side of the Soldiers and Sailors Monument to the promenade which lies over the Penn Central tracks.

Proposed Highway The proposed highway continues in covered section at 89th Street. Noise levels for the area are below 65 dBA L_{10} throughout. Noise from Riverside Drive traffic is predicted to be between 60 and 64 dBA L_{10} for a small distance on either side of the street. The levels at the exteriors of buildings facing on the Drive will also be fairly low, ranging from 55 to 62 dBA L_{10}.

97th Street

Existing Highway With the existing Parkway, the majority of the park space is predicted to have levels from 65 to 69 dBA L_{10}. Only the western edge of the park will have lower levels, with the promenade at 63 dBA L_{10}.

Proposed Highway The levels shown indicate sources of noise from the interchange ramps and from Riverside Drive at this location. The fact that trucks are not permitted to use this interchange is reflected in the relatively low noise levels near the ramps. Noise levels from 60 to 55 dBA L_{10} are predicted for most of the park area at this location.

104th Street

Existing Highway Noise levels at this location will be higher than with the proposed highway. The location of the Parkway below the park space accounts for the widespread effect of traffic noise in this area.

Proposed Highway All of the park area below the level of Riverside Drive will have noise near the minimum attainable level of 55 dBA L_{10}. Only a small area near Riverside Drive will be above 65 dBA L_{10}; buildings facing the Drive will have exterior levels near 60 dB.

Noise Profiles in 1995

- Less than 65 dBA L_{10}
- 65-70 dBA L_{10}
- 70-75 dBA L_{10}
- 75-80 dBA L_{10}
- 80-85 dBA L_{10}

121st Street

Existing Highway Noise from the existing highway will be roughly comparable to that associated with the proposed solution. A small area near the river edge will experience levels over 70 dBA L_{10}, but most levels at this location will be from 65 to 69 dBA.

Proposed Highway Again, traffic noise levels for this highway configuration are predicted to be low. The 65 dBA L_{10} noise levels from Riverside Park affect only a small portion of the park space. At this point, however, noise levels of 65 to 70 dBA L_{10} from the ventilation building at 124th Street will be heard in the area from the transitway to the river.

147th Street

Existing Highway Noise from the existing highway would be less than that from the proposed highway. Levels on the ground at this location would be below 65 dBA L_{10} for the area from Riverside Drive to the Penn Central tracks.

Proposed Highway Noise at this location shows a reversal of the pattern in the locations to the south. The highway lanes have emerged from the covered configuration, and noise from autos, trucks and buses can now be heard. Although levels as high as 80 to 84 dBA L_{10} are indicated, they occur above ground level, and therefore would not affect activities in the park. However, levels from 75 to 79 dBA would extend throughout almost all of the park space, and would occur at the face of buildings along Riverside Drive.

Noise Profiles in 1995

- Less than 65 dBA L_{10}
- 65-70 dBA L_{10}
- 70-75 dBA L_{10}
- 75-80 dBA L_{10}
- 80-85 dBA L_{10}

1995 Noise Levels — dBA L_{10}

Location	Proposed Highway	Existing Highway
Amsterdam Avenue between 74th & 75th	74	78
Amsterdam Avenue between 85th & 86th	71	74
Columbus Avenue between 97th & 98th	72	76
Amsterdam Avenue between 113th & 114th	73	76
Broadway, 200 feet north of 116th Street	73	77
125th between Broadway and Amsterdam	79	74
Broadway between 146th and 147th	70	74
Amsterdam between 150th and 151st	73	76
Broadway between 165th & 166th	71	74

Non-residential Sensitive Sites

The only location in this category is the Columbia Presbyterian Hospital on Riverside Drive at 165th Street. Like the other locations along Riverside Drive in the area north of 123rd Street, this site is expected to experience higher noise levels from the proposed highway than from the existing highway, with 77 dBA L_{10} predicted for the proposed highway and 73 dBA L_{10} for the existing highway.

Interior West Side Avenues and Streets

Of the eleven sites in this category, calculations of 1995 noise were made for nine. These nine include three locations on Broadway, four on Amsterdam Avenue, one on Columbus Avenue, and one on 125th Street. Noise levels at the two remaining sites, 179th Street and Undercliff Avenue, could not be calculated because the model cannot account for the complex roadway configurations at these locations.

Results of the predictions for the nine sites are shown in the table above. Like the levels shown for Riverside Drive locations, these are the predicted levels at ground level.

Air Quality

In order to determine the effects on air quality of a new West Side Highway extending from 42nd Street north to the George Washington Bridge, an analysis was made of the movement of pollutants from vehicles on the roadway into the surrounding environment. This analysis was based on a series of meteorological measurements made in the study area, as well as the application of well accepted mathematical formulae describing the movement of pollutants in the atmosphere. These mathematical expressions were applied to both 1972 and 1995 traffic conditions in order to provide a comparison between these two years. In addition, 1995 traffic conditions were analyzed, assuming first, that the existing highway was still in place, and, second, that the new highway was in operation. This comparison serves to show the relative impact of the new facility on the air quality in a typical future year.

The study presented here is not a detailed or comprehensive air quality analysis. This work represents a simplified method of determining a probable order of magnitude of the air quality impact of the project, as well as a reasonable and conservative estimate of the relationship of the expected pollutant concentrations to the National Ambient Air Quality Standards. If this project were to move forward, a complete environmental impact statement would be prepared and would include a thorough analysis of the air quality impacts. It is not expected, however, that the conclusions of such an analysis would differ in substance from those reached in this study.

Mathematical Models

In order to provide an analysis of both the existing highway, which is entirely exposed to the air, and the proposed facility, which is partially enclosed with the resulting pollutants ventilated through exhaust stacks, it was necessary to use two separate mathematical formulations. Both mathematical models are recommended and distributed by the United States Environmental Protection Agency (USEPA). Due to the relative roughness of the terrain adjacent to the proposed facility, it is expected that even though pollutant levels will be considerably below national standards, the pollutant concentrations reported here will be in excess of those actually to be expected.

Meteorological Measurements and Assumptions

In order to determine the most probable wind directions and speeds for use in predicting pollutant concentrations, wind measurements were made at two locations in the study area—the Marine Transfer Station at 135th Street and the West Side Highway exit ramp at 79th Street. The Marine Transfer Station is located directly on the river. Because the West Side Highway over the length under consideration, with the exception of North River Pollution Control Plant, is free of outboard obstructions, the winds at the Marine Station can be considered wholly representative of those that will initially affect highway pollutants. These pollutants will then be modified by passing over the relatively rough inland terrain. This effect is seen in comparing the 79th Street ramp station and the Marine Transfer Station. The wind frequency distribution at 79th Street shows a broadening of the direction bands and a sharp drop in the average wind speed as compared to the Marine Transfer Station. The lack of northeast winds at this inboard site is due to the blockage effects by buildings and terrain along Riverside Drive. These aspects serve to deflect the air to the more northern quadrants parallel to the building and terrain lines.

For analysis presented here, two important meteorological assumptions were made. First, the worst case stability class is assumed to be level five, or slightly stable. The worst case wind speed is assumed to be one meter per second (2.2 miles per hour). These values were chosen as worst case meteorological because of the locations of this portion of the West Side Highway adjacent to the Hudson River and to a relatively open terrain to the east. Even during inversions, the Hudson River shore experiences onshore breezes with frequent shifts in directions that make more stable conditions impossible even during one-hour periods. The coincidence of peak traffic, level six conditions (stable) along with winds less than one meter per second operating in a single direction for one hour are not expected ever to occur during a single year. Thus, the level five, one meter per hour wind speed conditions are concluded to be worst case meteorology.

Pollutant Emission Assumptions

Motor vehicle pollutant emissions were determined on the basis of number of vehicles, average vehicle speeds during peak and off-peak traffic conditions, and on emission factors derived from USEPA Publication AP-42, 2nd Edition, Supplement No. 2, September 1973. Ambient carbon monoxide values for 1972 were assumed to be three parts per million (ppm) and for 1995, 0.9 ppm. These values were added directly to the one-hour and eight-hour concentrations.

Results

Although the mathematical models used in this analysis are applicable to any gaseous pollutant, only carbon monoxide was analyzed. This pollutant is the only one for which a local concentration analysis appears relevant. Other principal pollutants, such as hydrocarbons and nitrogen oxides, must be analyzed on a regionwide basis. Because the portion of the West Side Highway under consideration here carries far less than one percent of the vehicle miles travelled in the New York region, it does not contribute significantly to the regional load of hydrocarbons and nitrogen oxides.

The results of the analysis for carbon monoxide are shown below. The tabulated concentrations represent the carbon monoxide levels as calculated at the edge of a typical or average section of the West Side Highway between 42nd Street and the George Washington Bridge. Also, it should be noted that the concentrations correspond to a height of approximately six and one-half feet.

It is seen that in 1972 both the one hour and eight hour carbon monoxide standards were exceeded if the specified "worst case" meteorological conditions were present. That the 1972 concentrations shown in Table 6 are at least twice the Federal standard for the one-hour case and almost five times the Federal standard for the eight-hour case, can be ascribed directly to the fact that concentrations were computed at the immediate edge of the West Side Highway. In reality, of course, the bulk of the park land is not located this close to the roadway and further away from the edge, carbon monoxide concentrations decrease significantly. Furthermore, an analysis of a brief period of local wind data and a one year record from LaGuardia Airport indicate that an eight-hour persistence of the meteorological conditions which generated the peak eight-hour carbon monoxide concentration is highly improbable. The eight hour value represents, therefore, an upper bound on the expected maximum average pollutant level to be found over an eight-hour period.

Carbon Monoxide Concentrations
(Parts per million)

Case	Peak One Hour	Peak Eight Hour
1972 (1)	76.8	42.4
1995 Existing Highway (1)	4.8	3.0
1995 Proposed Highway Uncovered (1)	9.4	5.7
1995 Proposed Highway Covered (2)	4.6	3.0
Federal Ambient Air Quality Standard	35.0	9.0

Notes

1 Calculated at the eastern edge of the roadway, 2 meters above the ground

Wind Speed 1 meter per second
Wind Direction – approximately parallel to roadway
Stability Class — 5, slightly stable

1972 concentrations include 3 ppm ambient
1995 concentrations include 0.9 ambient

2 Calculated at ground level at point of maximum concentration, 180 meters east of tunnel exhaust. Includes autos, trucks and buses

Wind Speed 2.5 meters per second
Wind Direction approximately perpendicular to roadway
Stability class 3, slightly unstable

Concentrations include 0.9 ppm ambient

In 1995 it is predicted that carbon monoxide concentrations will fall far below the Federal Ambient Air Quality Standards, even under the most adverse meteorological conditions to be expected on the West Side. As can be seen from the adjoining table this decrease is expected to occur whether or not a new highway is built. The reduction in concentrations is attributed primarily to the projected decrease in carbon monoxide emissions—due, in turn, to the increasingly stringent motor vehicle emission factors outlined by the U.S. Environmental Protection Agency—between these two years.

Uncovered portions of the new highway would cause somewhat higher concentrations than would the continued operation of the existing facility in 1995, because of the presence of truck and bus traffic on the new highway. These heavy duty vehicles generate more pollution than automobiles and, therefore, tend to raise carbon monoxide levels. As previously mentioned, however, concentration values for both the new highway and the existing facility would be well below the Federal standards in 1995.

Covered portions of the new West Side Highway would cause approximately the same carbon monoxide concentrations as would be expected if the existing highway were left operating. There is an important difference, however, between operation of the existing facility and operation of a new highway with regard to the size of the areas affected by pollutant emissions. Because no sections of the existing highway are enclosed, i.e., there are no tunnel sections, pollutants are more or less uniformly distributed along the entire length of the roadway. On the other hand, a new highway would include considerable lengths of roadway which would be enclosed and mechanically ventilated. The pollutants generated in these enclosed portions would be dispersed inside the tunnel, collected in a duct system, and then exhausted into the atmosphere at points selected to minimize adverse impacts on air quality. For those areas of the park adjacent to the covered portions of the highway, the contribution of tunnel traffic to the overall ambient carbon monoxide levels would be negligible. ■

The West Side Highway North of 42nd Street
A Proposal For Discussion

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